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PLATE XVII.

The Plate of *Turnix tanki*, Indian Button Quail, not having arrived in time for publication with this number it will be issued with No. 5, Vol. XXIII, the Index Number.

EDITORS.



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JOURNAL OF THE Bombay Natural History Society.

MAY 1915.

VOL. XXIII.

No. 4.

THE GAME BIRDS OF INDIA, BURMA AND CEYLON.

BY

E. C. STUART BAKER, F.L.S., F.Z.S., M.B.O.U.

PART XVII.

With Plate XVII.

TURNIX TANKI TANKI.

The Indian Button Quail.

Turnix tanki.—(Buch. Ham.) Blyth, J. A. S. B., xii, p. 180 (1843); Ogilvie-Grant, Ibis (1889), p. 466; Oates, in Hume's Nests and Eggs, 2nd ed. iii., p. 370; Ogilvie-Grant, Cat. B. M., xxii, p. 544; Blanford, Avifauna, B. I., iv, p. 153; Oates, Game Birds of India, i, p. 63; Sharpe, Hand-List i, p. 49; Oates, Cat. Eggs, B. M., i, p. 72; Le Mess, Game, S. and W. B. of Ind., p. 115; Ogilvie-Grant, Game B., ii, p. 278; Seth Smith, J. B. N. H. S., xvii, p. 238; Whitehead, *ibid*, xx, p. 969; Moss King, *ibid*, xxi, p. 101; A. E. Osmaston, *ibid*, xxii, p. 544.

Hemipodius joudera.—Hodg., in Gray's Zool. Misc., p. 85; E. A. Butler, B. of Sind, etc., p. 56.

Turnix dussumieri.—Blyth, Cat., p. 256; Jerdon, B. of Ind., iii, p. 599; Godwin-Austen, J. A. S. B., xliii, pt. ii, p. 174.

Turnix joudera.—Gray, Cat. M. and B. Nepal, p. 129 (1846); Ball, Str. Feath., iv., p. 236; Butler, *ibid*, p. 8; Hume, *ibid*, p. 225; Butler, *ibid*, v., p. 231; Ball, *ibid*, vii, p. 226; Butler, Cat. B. of Sind, p. 56; Hume and Marsh., Game B., ii, p. 187; Butler, Cat. B. of S. Bomb., p. 70; Reid, Str. Feath., x, p. 64; Davidson, *ibid*, p. 318; Davison, *ibid*, p. 412; Macgregor, *ibid*, p. 441; Terry, *ibid*, p. 479; Taylor, *ibid*, p. 479; Barnes, B. of Bomb., p. 318, *id*, J. B. N. H. S., vi., pt. i.

Turnix albiventris.—Hume, Str. Feath., i, p. 310; *id*, *ibid*, ii, p. 281; *id*, *ibid*, iv, pp. 279-293; *id*, Cat., No. 834 ter.; Hume and Marsh., Game B., ii, p. 199; Ogilvie-Grant, Cat. B. M., xii, p. 445; Blanford, Avifauna, B. I., iv, p. 154; Oates, Game B., i, p. 66; Sharpe, Hand-List, i, p. 49; Le Mess, Game, S. and W. B. of Ind., p. 115; Ogilvie-Grant, Game B., ii, p. 280.

Vernacular names.—Lowa (*Upper India*), Pedda dabba gundla (*Telegu*). In most places the natives do not distinguish between this bird and the Common Bustard Quail.

Description: adult female.—From forehead to nape barred buff and brown, with indications, sometimes well defined, of a buff mesial stripe; nape, neck, and extreme upper back bright ferruginous red: remainder of upper parts, including inner wing coverts and innermost secondaries, greyish brown, occasionally an almost vinous tint, profusely barred with fine wavy lines of deep brown or dull black, giving these parts a vermiculated appearance, remaining wing coverts buff or brownish buff with a broad sub-terminal drop or short bar: inner secondaries like the back, and those next them more or less freckled with rufous near the tip, and with black and buff on the outer web near the tip, primaries, outer secondaries and primary coverts greyish brown edged with buff on the outer webs, edge of shoulder buff. Below from chin to upper breast reddish ferruginous albescent, and often pure white on chin and throat, and of the same colour on the upper breast as on the neck, these parts forming a broad collar: remainder of lower surface buff, deepest on the breast and flanks, and sometimes almost pure white on the centre of the abdomen; the breast next the collar in the centre, the sides of this and the rest of the breast and flanks nearly as far down as the thighs with large, round or crescentic spots of black.

Females, adult but not so old, as that above described, have the mesial line more strongly marked, the sides of the head are often much marked with rufous, and the black barring is very broad and prominent: the whole of the upper parts are much more heavily spotted and barred with black: the scapulars, and sometimes the back also, have drops of buff, succeeded by black on the outer webs of the feathers, sometimes becoming buff streaks on the former; the inner secondaries and the wing coverts are a purer buff, and the black drops or bars are far more numerous; the inner secondaries also as a rule have a good deal of rufous mixed with the vermiculations. Below, the colour is much like that in the description already given of the older female, but the grey-brown colour of the back often encroaches on the sides of the breast, the black markings are more numerous, and are occasionally mingled with pale buff spots. The chin and throat are nearly always paler, and almost, if not quite, white, and the buff of the belly is whitish, the centre of the abdomen being often pure white.

Colours of the soft parts.—Bill, fleshy white, greyish white, or pale plumbeous, always with a yellowish tinge at the base, and sometimes darker and brownish on culmen; legs and feet yellow fleshy or fleshy grey, sometimes with a tinge of orange; claws the same; irides straw colour or white, probably always white in old birds.

Measurements.—Length about 6·5" (= 165 mm.), tail about 1·5" from vent (= 38·1 mm.), tarsus rather under 1·0" (= 25·4 mm.), bill at front about ·5" (= 12·7 mm.), and from gape about ·7" (= 17·8 mm.). The wing in a series of about 40 birds (including the so-called *albiventris*) varies from 3·10" (= 78·7 mm.) to 3·52" (= 88·9 mm.) with an average for *tanki* of 3·43" (= 87·1 mm.), and for *albiventris* of 3·16" (= 80·2 mm.), though some of the *tanki* females are smaller than the largest *albiventris*.

Mr. D. Seth Smith has a most interesting article on this Bustard Quail in the Avicultural Magazine of 1903 (pp. 317 *et seq.*), and from what he records it would really appear that the nuchal red collar is only assumed by the female during the breeding season. He says:—

“It will be seen from the coloured illustration that appears with this, that in *Turnix tanki* the rufous nuchal collar is a very well marked feature of the female, and my two examples of this sex, when obtained on the 24th of October last, were in perfect full colour. However, as the winter approached, they commenced to moult, and *the collar was completely lost*, the plumage becoming apparently similar to that of the male, though I did not handle the birds to examine them minutely. The two females at this time exactly resemble some specimens in the series at the Museum, which are labelled immature, but which, I am now led to suppose, are really adults in winter plumage. Another fact which tends to prove this conclusion to be correct is, that a young female whose history I am about to relate, had developed a perfect rufous nuchal collar, at the age of six weeks.

“In March the females gradually regained their rufous collars.”

Adult male.—The adult male is similar to the first stage adult female, but entirely wants the chestnut collar, the centre of the breast is a paler, duller rufous buff, and the general appearance of the upper parts is less bright, though the vermiculations are larger, in places becoming almost bars.

The younger male resembles the second stage of female described but has no rufous collar. The colours of the soft parts are the same as in the female, but the bill is said to be brown on the culmen and at the tip. I have not noticed any difference myself between the bills of males and females.

Measurements: males.—Length about 6·0" (= 152·4 mm.); tail from vent about 1·3" (= 33·0 mm.); bill at front about ·45"

(= 11.4mm); and from gape about .65" (= 16.5mm.); tarsus a little over .8" (= 20.3mm.); the wing in a series of about 25 birds varies from 2.82" (= 71.6mm.) to 3.12" (= 79.2mm.), and there is one bird sexed as male in the Museum Collection with a wing of 3.30" (= 83.8mm.); excluding this, the average wing measurements for *tanki* is 3.06" (= 77.7mm.), and for *albiventris* 2.94" (= 73.7mm.), though, as in the females, the largest *albiventris* is bigger than the smallest *tanki*.

Quite young females have the nuchal collar very indistinctly shewn, and are plentifully spotted with white, and the feathers of the upper part are profusely barred with dull black. The white and buff markings of scapulars, and inner quills are almost entirely wanting, being represented only by a few pale spots on the outer webs of the quills and coverts. The primaries are margined and freckled with dull rufous on the outer webs, and the other secondaries have a pale margin and blackish sub-margin to the outer webs which are much freckled with dull rufous. The under parts are duller than in the adult, and are less boldly spotted with black and rufous.

The nestling closely resembles that of *Turnix pugnax pugnax* already described.

Hitherto *Turnix albiventris* from the Nicobars and *Turnix blanfordi* have both been treated as good species, but after a very careful examination of all the material at my command, I cannot discover any difference between *T. tanki* and *T. albiventris* upon which it is possible to make the one a different species or even subspecies to the other. The alleged differences according to Ogilvie-Grant between the two are as follows:—

1. *Albiventris* is smaller, having a wing of 3.2" as against 3.4" in *tanki*.
2. It retains the rufous feathers in the back in old age.
3. It has the nuchal collar wider, and of a deeper rufous.
4. *Albiventris* has the upper parts blotched and vermiculated with black like *blanfordi*, and the markings of the head like *tanki*.

Blanford gives the following differences between the two:—

1. *Tanki*.—Adults retain much of the black and rufous barring and mottling on the dorsal feathers.
2. The feathers on the side of the crown are black with rufous edges in *albiventris*.
3. The collar in the female *albiventris* is much darker and broader than in *tanki*.

Thus, Blanford only adds one more difference, that of the head, to the differences alleged by Ogilvie-Grant. We have therefore five alleged differences to deal with.

In the British Museum we have seventeen females of *Turnix tanki*, and eight of the supposed *T. albiventris* for purposes of examination, and I have also examined birds from other collections.

1. As regards size, I find that the average wing measurement of *tanki* is 3.43" for the female, and 3.06" for the males, whilst that of *albiventris* is 3.16" for females, and 2.94" for males. At first sight this would seem to prove that the two are separable as sub-species on account of size, an examination of individuals, however, disproves this. Thus, in the small series of eight *albiventris* in the Museum Collection, I find two birds with wings of 3.30" and 3.20", and in the series of seventeen *tanki* there are four with wings of 3.30" or under, of these one has a wing of only 3", and is possibly wrongly sexed, but there is yet another with a wing of only 3.15". Thus, with two small series containing birds which overlap in size to such an extent, it is impossible to accept an *average* difference of measurement as sufficient grounds for division into species or sub-species unless there are other and better differences with which to support it.

2. As regards the nuchal collar, I must premise my remarks by pointing out that some of the adult birds in the British Museum series labelled *tanki* have their necks so injured that the red collar has practically disappeared; on the other hand, of the seven adult *albiventris*, no less than five have their necks drawn out and so arranged that the width of the collar is exaggerated. The other two if compared with the best specimens of *tanki* will not be found to differ to any appreciable extent in width. As regards colour, it would also be easy to select two *tanki* to put with these two *albiventris* so closely resembling each other in this respect that no one could name them except by chance.

3. As regards the colouring of the upper parts, I consider this only individual; thus, there is a specimen of *tanki* from Allahabad (No. 89.5.10.445) which has more rufous on the back than any specimen of *albiventris*. Again, there are many specimens of young *tanki* which have the back as much mottled with black as the young *albiventris* have. Therefore, the only difference left as regards the colouration of the back is the allegation that *albiventris* never assumes the vermiculated unblotched appearance of *tanki*. But this stage of plumage appears only to be assumed by *very* old females, and is quite exceptionable. In the Museum Collection I find only two such specimens of *tanki* and of the many hundreds of these birds which have passed through my hands, I do not think that I have seen half a dozen birds in this, so-called, adult female plumage. With the few *albiventris* available for examination,

it cannot be said that we have enough material to lay it down as a demonstrated fact that *albiventris* does not ever assume this plumage.

4. Next we have Blanford's assertion that in *albiventris* "the feathers on the sides of the crown are black with rufous edges" and the attendant inference that this is never so in *tanki*. This again is an individual character and the specimen of *tanki* from Allahabad, to which I have already referred, will be found to have this phase of plumage quite as strongly marked as it is in most of the specimens of *albiventris*. Again, if we examine the head of specimen No. 89.5.13.129, an *albiventris* from the Nicobars, we shall see that this bird has far less black on the head than the majority of *tanki*.

I think, therefore, upon consideration of the points of difference brought forward, and a very careful examination of the skins available, there are not sufficient grounds to justify the Nicobar bird being named even as a sub-species, far less to make it a good species.

Distribution.—The Indian Button Quail is found over practically the whole of India, but it does not, apparently, occur in Ceylon. Hume received specimens from South Travancore, I have had specimens sent me from near Tinivelli in the extreme South of Madras, and also specimens from Mysore, whence it had not previously been recorded. In the North-West it straggles into the Punjab, but probably only during the rainy season; it is found throughout Bombay and the North-West Province, and thence East everywhere as far as Calcutta. In the furthest North-East it extends throughout the Assam Valley to Dibrugarh and Sadiya, but South of the Brahmapootra Valley it is replaced in most parts by *Turnix blanfordi*, though a specimen from Tippera in the Hume Collection is nearer *T. t. tanki* than *T. t. blanfordi*. I never came across it either in the Cachar Hills, Khasia Hills or Surma Valley, and I think I may say, it does not occur there. It ascends the Hills to a considerable height, for it has been found in the Nepal Hills up to 4,000 feet; Finn found it in Darjeeling at over 6,000; in native Sikkim it has been obtained up to 7,500 feet (in the month of June) and in the Travancore Hills and Palnis up to 4,000 feet; finally, it occurs commonly in the Nicobars and also in the Andamans.

Nidification.—Wherever the Indian Button Quail is found, it breeds, but there is curiously little recorded, so far, as to its habits in this respect in a wild state.

Hume records eggs taken on the 15th of July and 26th of August, and there are others in the Hume Collection in the British Museum taken on the 29th of April, and one in June. From Bengal and Behar I have eggs taken in May and June, but the normal months

are July, August and September, Dibrugarh in July and August, Gaohati, May and June, and Tezpur, June. There appear to be no records of its breeding in any of the cold weather months from November to March, and it would really seem as if this Hemipode, unlike others of the genus, except *T. tanki blanfordi*, really had a regular breeding season, commencing as a rule with the break of the rains in the middle of June, and continuing until early October.

The few nests I have personally seen were just like those of the Common Bustard Quail, and like that bird's, the nest is sometimes roughly domed, sometimes a well made pad, and sometimes a rather meagre affair of grass and roots in some natural hollow.

The nest is placed in much the same sort of position as is that of its relations already described, but I think it adheres more closely to grass-land for nesting purposes, and also it likes grass which is rather thin and scanty with ample room to run about in.

All Hemipodes, in India at all events, are very easy birds to keep in captivity, and some Aviculturists at home have also been very successful with these birds, and have obtained much information of great interest as to their polyandrous habits.

Mr. Seth Smith in the article, to which I have already referred, gives a most interesting account of this bird's breeding habits in captivity:—

“The pair,” he relates, “as a rule, keep fairly close together, but otherwise appear to take very little notice of one another. As the days lengthened they seemed to become somewhat interested in a certain corner. The hen would sometimes squat in this corner with her breast on the ground and her tail pointing upwards, and made a peculiar soft clucking noise. The cock would then go and take his turn in the same corner, the hen having moved out. At this time, the hen would often be seen rocking her body backwards and forwards in a peculiar manner, but I saw nothing approaching actual nuptial display by either sex, in fact, they seemed to regard one another almost with indifference, except when I threw a meal-worm to the hen, when she would generally (though not always by any means) hold it in her bill, and stretching out her body, remain motionless, glancing sideways at the male, until he ran up and took it. Probably she actually called him, though I could detect no sound. At any rate, she presented tit-bits to him, precisely the same way as he, later on, presented food to his chicks.

“Just as the males of other Gallinaceous birds will pick up dainty morsels and gallantly present them to their wives, here we have a case in which the order is exactly reversed, the females, most unselfishly, presenting the most attractive morsels to their husbands.

“On April 24th a slight nest of hay was observed in the above mentioned corner, and on the following day I discovered one egg in the nest. On the 27th a second egg was laid, and a third on the 28th, on which day the male began to sit, and, although the nest was in a perfectly open place, and I was obliged to disturb him each morning as I went to feed the birds, he continued his task in a most praiseworthy manner, and, on May 10th, hatched all three eggs, incubation having been completed in the incredibly short space of twelve days.

“From the day she laid her third egg, the female appeared to take no notice whatever of the nest, and even when the young were hatched, apparently ignored the presence of both her mate and offspring. In fact, I found that she ate most of the food that was provided for the chicks, and so shut her in a separate place.

“The little cock took the greatest care of his charges, brooding them most tenderly, and attacking any living creature, including myself, that might approach them too closely. He would pick up minute insects and hold them in his bill until the chicks came and picked them from him, and, for the first day or two, the chicks, so far as I was able to observe, never picked up food for themselves.”

As with all other Hemipodes the full clutch of eggs laid is four, and I have never seen a greater number than this or a smaller number, which showed signs of incubation.

The eggs, except in size, agree in every detail with those of *Turnix taijoor taijoor*, but on the whole are possibly rather more boldly coloured. The specimens with big, bold blotches are decidedly common, though the majority are merely profusely stippled and speckled with reddish or greyish brown, with a few quite small dots and spots of black or blackish.

The Museum eggs vary between $\cdot 85''$ ($= 21.6\text{mm.}$) and $\cdot 9''$ ($= 22.8\text{mm.}$) in length, and are $\cdot 75''$ ($= 19.0\text{mm.}$) in breadth. 40 eggs, including the above 7, of which I have the measurements, vary in length between $\cdot 82''$ ($= 20.8\text{mm.}$) and $\cdot 95''$ ($= 24.1\text{mm.}$) and in breadth between $\cdot 71''$ ($= 18.0\text{mm.}$) and $\cdot 81''$ ($= 20.6\text{mm.}$), and they average $\cdot 88'' \times \cdot 76''$ ($= 22.3 \times 19.2 \text{ mm.}$).

Habits.—The Indian Button Quail frequents much the same kind of country as does the Black-breasted Bustard Quail and the Little Button Quail, but is, on the whole, even less fond of dense forest than are these birds, and prefers grass lands to bush jungle, though often found in the latter. It also frequents all kinds of crops, from the lowest to the tallest, such as sugarcane when dry, and the young jute before it has been flooded. Nowhere, that I have heard of, can this bird be said to be common, and one or two in the course of a long day's shooting is all that is usually met with.

Perhaps the most favourite haunt of this little Button Quail is thin thatching grass on the edge of dry cultivation. Hume's experience was much the same as mine, for he says that in the North-Western Provinces, Oudh and the Central Provinces, he found them much wedded to grass, but he adds that he has known *several* flushed out of patches of grass half an acre in extent. Tickell, writing of this bird, records that it is

“found scattered about here and there throughout Bengal in open, sandy, bushy places in and about jungles or fields and dry meadows in cultivated country; frequently in low gravelly hills of *Kunkur* (nodular limestone).”

So also Jerdon.

“This species is found in open grassy glades in forests or jungles, both on the plains, and more especially in the hilly countries, and is also found in grass jungles throughout Bengal, and the countries to the Eastward. It is always seen singly, in patches of long grass or thick cultivation, flying but a short distance, and is very difficult to flush a second time.”

It is an even greater skulker than the Bustard Quail, and though like this bird in manner of flight, it is not so strong or noisy on the wing, and drops even more quickly into cover. Hume says that

“it rises only when you are about to step on it with occasionally a low double chirp, barely audible to my ears. . . . It glides bee-like through the air for a few paces, just skimming the waving tops of the grasses, and drops suddenly as if paralysed, almost before you can bring your gun to the shoulder.”

They feed both on grain, grass seeds, green shoots of crops, etc., and on insects, more especially ants. Their flesh is not bad to eat, though rather dry unless very fat. Tickell, however, considers them “most delicious, and when in good plight as fat and delicate as an ortolan.” Hume, on the other hand, “always found them insignificant, dry, insipid little things.”

TURNIX TANKI BLANFORDI.

The Burmese Button Quail.

Turnix blanfordi.—Blyth, J. A. S. B., xxii, p. 80 (1843); Blyth and Walden, B. Burma, p. 151; Ogilvie-Grant, Cat. B. M., xxii, p. 542; Blanford, Avi., B. I., iv, p. 155; Sharpe, Hand-List, i, p. 49; Oates, Game B. Ind., i, p. 68; Le Mess, Game, S. & W. B. Ind., p. 115; Ogilvie-Grant, Game B., ii, p. 277; Stuart Baker, J. B. N. H. S., xii, p. 493; Seth Smith, *ibid*, xvii, p. 238; Harington, *ibid*, xix, p. 365; *id*, *ibid*, xx, p. 377; Hopwood, *ibid*, xxi, p. 1215.

Turnix maculosa.—Apud Gray, Hand-List, B., ii, p. 270; Hume & Dav., Str. Feath., vi, p. 452; Hume, Cat. No. 834 bis.; Hume

and Marsh., Game B., ii, p. 183; Bingham, Str. Feath., ix, p. 196; Hume, *ibid*, p. 208; Oates, B. Burma., ii, p. 335; Hume, Str. Feath., xi, p. 312.

Vernacular names.—Ngôn (*Burmese*), Dao-duma gajao (*Cachari*), Iniruibuma ghéhérta (*Naga*).

Description, adult male and female.—

“ This is but a little more than a large race of *T. tanki*, but, besides their greater size, adults are distinguished by being darker and by retaining a larger amount of black barring on the back; the sides of the crown too are darker. In immature birds the pale edgings to the dorsal feathers are conspicuous.” (Blanford.)

Colours of the soft parts.—In the male the bill is pale horny brown, with a tinge of yellowish flesh colour or yellowish at the base of the maxilla, and on the mandible, tip and apical half of culmen a darker brown; legs, feet and claws yellowish, in some cases rather fleshy, and in some a more distinct Chinese yellow. Irides white.

In the female the bill is paler and more yellow; according to Hume “ lower mandible, gape and base of upper mandible chrome yellow.”

Hume gives the measurements of two birds as follows:—

“ *Male.*—Length, 6.5"; expanse, 12.0"; tail from vent, 1.5"; wing, 3.62"; tarsus, 1.0"; bill from gape, 0.75"; weight, 2.25-oz.

“ *Female.*—Length, 7.0"; expanse, 13.5"; tail from vent, 1.5"; wing, 4.12"; tarsus, 1.05"; bill from gape, 0.75"; weight, 2.75-oz.”

Oates gives the measurements as being:—

“ Length, 6.5"; tail, 1.6"; wing, 3.5"; tarsus, 0.9"; bill from gape, 0.75"; the female is much larger, the wing reaching to nearly 4" in length.”

I have now examined a comparatively large series of this sub-species, including 21 males and 25 females in the British Museum Collection, and I cannot find that any of the alleged differences in colouration between *tanki* and *blanfordi* mentioned by Blanford hold good.

It is quite true that as a body the Eastern form is darker than the Western, but individuals can be obtained in either sub-species to agree with specimens in the other.

There is, however, so great a difference in the size of the two birds that this is quite sufficient in itself to constitute the Eastern and Western forms as good sub-species.

The average length of wing in *T. t. tanki* is 3.43" (=87.1mm.) whereas in *T. t. blanfordi* the same average measurement is no less than 3.93" (=99.8mm.), a full half inch difference. The same

measurements for the males are 3.06" (=77.7mm.) and 3.53" (=89.6mm.) respectively.

Even in these two sub-species, however, certain individuals approach one another in size, though they do not overlap as the different forms of *pugnax* do. Thus the largest *tanki* has a wing of 3.52" (=88.9mm.), whilst the smallest *blanfordi*, a bird from Chefu, has a wing of 3.64" (=9.24mm.).

Oates, in the "Birds of British Burmah", writes:—

"The plumage of both is identical"

and Hume remarks:—

"So far as plumage goes, both these species and *joudera* (*tanki*) are inseparable. At any rate, nine out of ten variations in tint, amount and extent of markings, etc., in this species (*blanfordi*) can be exactly matched in specimens of *joudera* and *vice versa*."

Distribution.—The Burmese Button Quail extends throughout the whole of Burmah as far South as the South of Tenasserim through the Shan Hills, Siam, China, throughout the West and South, as far as Manchuria in the extreme North-East and from Burmah to N. E. India.

Within our limits it is found throughout Burmah, Shan States, Chin Hills, Lushai Hills and thence through the Chittagong Hill Tracts, Hill Tippera, and N. Cachar Hills into the Khasia Hills. It is also found in the Plains districts of Chittagong, Comilla, Sylhet, and Cachar, though a bird collected by Tickell in Tippera was a true *T. tanki tanki*. In the Naga Hills also the typical form takes the place of *blanfordi* and the Cachar Hills and Manipur seem to be the limit of the latter to the North-West.

Nidification.—Needless to say, the hens are polyandrous, or bigamistic would be better, as they only have one husband at a time, though the time is very short.

As a general rule, the nest and eggs of *Turnix t. blanfordi* cannot be distinguished from that of *T. p. plumbeipes* but probably on the whole is not so well and compactly built, not so well finished off, and not so often domed. Moreover, twice I have taken its nest in open bamboo jungles, at the foot of one of the clumps, well hidden, but the nest consisting of little more than a pile of the leaves and roots of bamboos in a hollow in amongst the roots.

In the Khasia Hills the birds frequent the great open grass plains so common in these hills, and will seldom, if ever, be found in the Pine Forests or evergreen jungle in the wetter nullahs. Their nests also therefore will be found almost exclusively in grass, though on rare occasions one may be found in a stony ravine with bush jungle in it.

If a clutch of hard set eggs is found, the vicinity should always be carefully searched for another nest as the hens directly they have

laid the fourth egg of one clutch, obtain another male and again start laying. The eggs take less than a fortnight to hatch, but before one set of chickens are ready to appear, she is generally laying again, and as a rule, somewhere quite close to her first clutch.

The regulation number of eggs is, of course, four, and as regards appearance and size there is nothing to add to the description of the eggs of *T. pugnax plumbipes* from which it is impossible to discriminate them, though the eggs of Blanford's Button Quail average much larger. I have one clutch which averages $1.08'' \times .86''$ ($= 25.6 \times 23.8$ mm.), another $1.15'' \times .92''$ ($= 29.3 \times 25.3$ mm.), and a few others about the same. The average is $1.02'' \times .83''$ ($= 25.9 \times 23.1$ mm.). This sub-species, unlike *plumbipes*, does, however, seem to have a definite breeding season, and in Cachar and the Khasia Hills they commence breeding at the end of April, and continue until the end of August, a few extra energetic hens continuing to lay as late as the end of September.

There is very little on record about this form of Button Quail, but, of course, its habits differ in no way from those of the other sub-species.

Davison, as quoted by Hume, says :—

“ I have always found this species about gardens or in the immediate vicinity of cultivation, but it is very rare, being only occasionally met with, and always singly or in pairs. It is hard to flush, and only flies a short distance before again dropping, but it then runs a considerable distance before halting, and thereafter lies very close. It feeds like other Quails in the mornings and evenings, lying hidden during the heat of the day. On cloudy or rainy days it moves about all day. I do not know the call of this species.”

Oates writes about this bird to much the same effect :—

“ This Quail is invariably found about gardens in the jungle singly or in pairs. I have shot it also in bamboo jungle where there was an undergrowth of grass. It is less common on the hills than in the plains. On the whole this is perhaps the most abundant and universally distributed of all the Quails of Burmah, but nowhere will enough be found together to furnish sport.”

In North Cachar the Burmese Button Quail is almost common, and they are also to be found in some numbers on the Khasia Hills, but everywhere else in India it is a comparatively rare bird, and—contrary to Oates' experience—everywhere it appears to be much more rare on the plains than on the hills. It ascends to a good height, and in N. Cachar I came across it at Laisung and Boro Ninglo, both villages with much scrub and grass land between them and the forest, at elevations of about 5,000 feet. A Khasia also

trapped me a specimen, a male on its eggs, on the Shillong Peak, which is about 6,000 feet. As a rule, though, in both these districts the birds do not wander much over 4,000 feet, and only as high as this in the hot weather.

In N. Cachar I found it occasionally in grass lands or in bamboo jungle with light undergrowth, but, more often in the dense secondary growth, which grows very rapidly on all deserted ex-cultivated land. Out of such jungle I got several of these birds when beating for Jungle Fowl. On the wing it is impossible to discriminate between the Button Quail and the Bustard Quail, so that until I had picked the bird up, I could never say which it was. As a rule they would just fly across the path where I stood awaiting the beaters, and then make their headlong dive into the jungle on the far side. Being then loaded with big shot, it was useless firing, but the beat over, I would sometimes have the jungle again beaten, and then my gun being loaded with No. 10, would often get a shot as the small birds footed it, at racing pace, across the open. As a rule I found I had bagged a Bustard Quail, but every now and then one of these would be picked up.

My own impression is that the Burmese Button Quail is not hard to flush the first time he is disturbed. True, he does not get up until you are almost on him, and if not approached within a few feet, or even inches, will remain quietly where he is, and not rise at all. But he does not *run at first*, and if approached near enough, he always rises and goes away on the wing, but once he has again dropped, he will run great distances and refuse to rise unless absolutely forced to do so. Generally, indeed, if compelled to pass over small open spaces, he will do so on foot in preference to taking to flight.

On one occasion, when waiting for a leopard which used to come and drink at a pool near my house, I was enabled to watch the actions of a cock bird and his three chicks for some time. I was seated on the ground in a comparatively open space in some thin bush jungle which grew round a Cachari village, and shortly after dawn, a cock Button Quail came down to drink, leaving his little family a foot or two behind him whilst he came down to the edge of the pool. The young, which were two or three days old, did not drink, but as soon as the little cock had had his fill he came back and began busily turning over and scratching up the sand apparently hunting for ants. He was so close to me that I could distinctly hear him now and then give a little "chuck," whereupon his children gathered round him, and he would then present one with some insect or other article too small for me to see what it was. As far as I could watch the young ones—they were so quick and restless that they were hard to follow—they picked up nothing themselves, except once, when their parent took them to a heap of

dried cow droppings, and here they seemed to be feeding themselves with something. After feeding for about half an hour, during which they were in and out of sight amongst the bushes, the cock settled down within a couple of yards of me, and gathered his chicks under him, but an unfortunate movement on my part at this moment sent parent and chicks skurrying away into the undergrowth, and I saw no more of them.

They are principally seed and vegetable eaters, but undoubtedly take ants and other small insects as they come across them, and a tame bird I had for a few weeks ate gentles and spiders greedily.

The call of the Burmese Button Quail is, to me, indistinguishable from that of the Bustard Quail, and I could never tell which bird was calling unless they were afterwards put up and shot. They were far less common than the Bustard Quail, and presumably the females cannot meet as often as the hens of that species do, but, when they do come across one another, they fight just as freely. Two hens were once brought to me in camp, in a little split bamboo basket, and the two continued to fight at intervals all day until I eventually released them, one on either side of my hut, whence they boomed defiance at one another until sunset.

(To be continued.)

SCIENTIFIC RESULTS FROM THE MAMMAL SURVEY.

No. X.

A.—THE INDIAN BATS ASSIGNED TO THE GENUS *Myotis*.

BY

OLDFIELD THOMAS.

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In connection with the naming of certain bats obtained during the Bombay Survey by Messrs. Shortridge in Tenasserim, Crump in N. India and Mayor in Ceylon, I have re-examined all the members of the *Myotis* group, and made some preliminary notes on their characters and nomenclature; and these I now venture to publish, imperfect as they are. Practically nothing had been done in this direction since Dobson's Catalogue of 1878, as the publications of Anderson and Blanford were so entirely based on that as hardly to represent any material advance in knowledge.

To begin with I would suggest that as a matter of convenience, the sub-genus *Leuconoe*, containing the large-footed members of the group, should be recognised as a full genus, thus dividing one of the largest and most difficult genera of Bats. Not only is there a difference in the size of the foot, but there are even differences in habits between the groups, while the skull of *Leuconoe* has a more or less characteristic shape, which shows that the group is a natural one, difficult as it is to define. The best account of it is that in Mr. Miller's synopsis† of the European species of *Myotis*, where the characters of the three species of *Leuconoe*, *dasycneme*, *capaccinii*, and *daubentoni* are placed in contrast with those of the ordinary members of *Myotis*.

I.—MYOTIS PROPER.

Myotis myotis group.

Of this group of large grey species, the Indian representative is *M. blythii*, Tomes, of which the Museum contains the type (skin and skull) from Nusserabad (Boys), the type of *Vespertilio africanus*, Dobs. from unknown locality, and a male in spirit from Simla recently presented by Mr. P. T. L. Dodsworth.* It is probable that *M. dobsoni*, Trouess. (*V. murinoides*, Dobs.) is also a synonym of *M. blythii*.

Myotis formosus group.

Examples of the handsome *M. formosus* are in the Museum from Nepal (Hodgson) (type); Mussoorie (Hutton); Dharmasala

† Cat. Mamm. W. Europe, p. 168, 1912.

* See Journ., Bombay N. H. Soc., 1914, p. 740.

(Bombay N. H. Soc.) and Lake Palti, Tibet. Also from Formosa (Swinhoe). *M. rufo-niger*, Tomes, from the Yang-tze is still more richly coloured, smaller, with smaller teeth and a differently shaped skull.

A species which appears to be allied to *M. formosus*, though without the characteristic coloration, is the following :—

Myotis sicarius, sp. n.

General size as in *M. formosus*, but the wing-bones longer. Ears about as in *formosus*, much smaller than in *blythii* or *dobsoni*, inner margin convex below, nearly straight above ; tip narrowly rounded off ; outer margin slightly concave above, convex below, with a narrow basal lobe. Tragus rather short, its inner margin straight, outer margin slightly convex, the broadest part near the base of the inner margin ; basal lobule large rounded. Wings from the metatarsus near the base of the toes. Calcar reaching about half-way towards the tail-tip ; a narrow post-calcarial lobule present.

Colour dark-brown above and below, the extreme tips of the belly hairs whitish. Wing-membranes uniformly translucent brown.

Teeth exactly as in *M. formosus*, the small middle premolar similarly crowded inwards above and in the tooth-row, though crushed below. In *M. blythii* the small premolars are uncrowded both above and below. In *M. dobsoni* the “first upper premolar is very small, scarcely visible from without, and not much larger than the second,” a condition which does not occur in any *Myotis* I have seen, and possibly abnormal.

Dimensions of the type (not quite fully adult) :—

Forearm 53 mm.

Tail 46 ; ear on inner margin 13.5 ; tragus on inner margin 5.3 ; third finger, metacarpus 46.5, first phalanx 12.5 ; tibia 21 ; hind foot 10.2.

Skull, front of canine to back of m^3 6.7 ; front of p^4 to back of m^2 4.6.

Hab.—Northern Sikim.

Type.—Immature skin in spirit, B. M. No. 91.10. 7. 56, collected by L. Mandelli. Presented by W. T. Blanford.

The specimen on which this species is founded was in Mr. Blanford's collection, but was never definitely determined by him. At one time it was supposed to be *M. dobsoni*, but is distinguished from that animal (which probably equals *M. blythii*) by its much shorter ears and feet, and such other characters as distinguish it from the *M. myotis* group, to which *M. dobsoni* was said to belong. From *M. formosus* it is at once separated by the absence of the “dead-leaf” pattern.

Myotis peytoni, Wrought.

A very distinct species, characterised by its considerable size (forearm 45-46 mm., skull length 17-18) and the crushing in of its middle premolars, both above and below. It shows no approximation to *Leuconoe* either in foot or skull.

Myotis muricola, Gray.

Not so common a bat as has been supposed, three out of the four synonyms assigned to it by Blanford being really referable to the *mystacinus* group. *V. (Pternopterus) lobipes*, Peters, from Arakan is alone correctly placed under *muricola*.

The skull is broader and more solidly built than in the *mystacinus* group, and the teeth, especially the canines, are heavier, and the posterior of the two small premolars is more crowded inwards. There is a narrow post-calcarial lobule.

Bats referable to *muricola* occur from Kashmir through the Himalayas and down further India to Borneo and Java.

Myotis amboinensis, Peters's "*Vespertilio adversus* var. *amboinensis*"† not mentioned in Dobson's Catalogue, is a larger ally of *M. muricola* found in Celebes, Buru, Amboina and Ceram.

Myotis mystacinus group.

To this group are referable quite a number of the names which have been applied to the smaller Indian members of *Myotis*. Thus *siligorensis*, Tomes, *darjelingensis*, Tomes, *caliginosus*, Tomes, *blanfordi*, Dobs., *nipalensis*, Dobs., and *moupinensis*, M. Edw., all seem to be assignable to this group.

How many Indian species there are in it I am not at present able to determine, but all may be distinguished from the European *mystacinus* by the deeper and more sharply defined notch on the outside of the ear. There appear to be at least two distinguishable forms, one with low brain case and the canines of normal size, about as in *mystacinus*, and the other with a high crown and the canines much reduced, especially below. For the first the earliest name is *caliginosus* (syn. *blanfordi* and perhaps *nipalensis*), and for the second *siligorensis* (syn. *darjelingensis*), both represented by their types in the British Museum.

Bats of this group have as yet only been found along the mountainous regions of N. India, not in the South, nor in Ceylon.

II.—LEUCONOE.

The genus *Leuconoe* is richer in Indian species than has been supposed, and I find that five different forms may be recognised. Blanford includes four species, but one of these is the European

† MB. Ak. Berl., 1866, p. 400.

M. daubentoni, whose occurrence in India is extremely doubtful, and he gives separate headings to *L. longipes* and *L. megalopus*, which I believe to be identical.

On comparing a co-type of the first of these with the actual type of the second (B. M. Nos. 76. 3. 10. 4 and 73. 4. 16. 1), I find that they are similar in all respects and should undoubtedly be united. The name should be *L. longipes*, Dobs., as I agree with Blanford that Blyth's *Myotis theobaldi* must be set aside as indeterminate.

The types of the latter are lost, and the measurement of the foot, " $\frac{7}{16}$ in." does not agree with that in *L. longipes*, nor, without knowledge of how it was taken, or with what exactitude, can it be fitted to any other species.

The Indian species of *Leuconoe* may be distinguished by their skulls as follows:—

- A. Skull length 16 mm. or more. Breadth of brain case over 8 mm.
 - a. Middle premolar crushed inwards, less than one-third the size of p^1 .
Ceylon, Java. *L. hasselti*.
 - b. Middle premolar not or little crushed inwards, at least two-thirds the size of p^1 .
 - a^2 . Larger, brain case less swollen, p^3 about two-thirds the area of p^1 .
Bombay. *L. peshwa*.
 - b^2 . Smaller, brain case more swollen. p^3 nearly equal to p^1 . Tibet, Formosa. *L. taiwanensis*.
- B. Skull length 15 mm. Breadth of brain case 7.4 mm. Andamans. *L. dryas*.
- C. Skull length 14 mm. Breadth of brain case 7 mm. Kashmir. *L. longipes*.

Leuconoe hasselti, Temm.

Six skins from Kokopeetchie, Eastern Province, and A' Pura, Northern Central Province, Ceylon, obtained for the Survey by Major Mayor are indistinguishable from authentic Javan specimens of *L. hasselti* in the British Museum.

There is also in the Museum an immature spirit specimen obtained in Ceylon by Dr. Ontdaatje in 1888.

Leuconoe peshwa, sp. n.

A medium sized dark coloured species allied to *L. horsfieldi*. Size rather larger than in *horsfieldi*. Fur fine and velvety; hairs on shoulders rather less than 7 mm. in length; on hind back

4 mm. Colour above dark sepia brown, darker than in Ridgway; extreme tips of dorsal hairs white, giving an inconspicuous hoary powdered effect. Undersurface pale brown, becoming greyer on belly and greyish-white in inguinal region. Ears rather short, not quite reaching the tip of the nose when laid forward; their inner margin evenly convex, outer slightly concave above, convex below, with a small outer basal lobe. Tragus not long, its inner margin straight, its tip rounded, outer margin convex, with well marked outer basal lobule. Wings to the side of the metatarsus about halfway between ankle and base of the toes. Length of foot going about once-and-a-half in that of the tibia. Calcar fairly long with well-defined tip, practically no postcalcarial lobe.

Skull very similar to that of *L. horsfieldi*, but larger throughout, and the brain case more inflated in the frontal region. Middle upper premolar about two-thirds the size in cross-section of the anterior one, slightly drawn inwards, but not completely invisible from the outside. Below, the corresponding tooth is three-fourths the size of p^1 , and stands quite in the tooth-row.

Dimensions of the type:—

Forearm 40 mm.

Skull, greatest length, 16.2; condyle to front of canine, 14.1; basi-sinual length 11.6; front of canine to back of m^3 , 5.9; front of p^4 to back of m^3 3.5.

A spirit specimen measures:—

Forearm 40 mm.

Head and body 55; tail 37; ear (inner margin) 13; tragus on inner margin 5.5; tibia 16; hind foot 10.5, calcar 14.6.

Hab.—Poona, Bombay. Alt. 2,000'.

Type—An adult female; skin, B. M. No. 0. 9. 16. 1. Original Number 181. Collected 17th August 1900 by R. C. Wroughton. Another female in spirit.

This species is representative of and closely allied to the Javan *horsfieldi*, Temm., but is browner, more heavily built, with thicker limbs and larger skull. I have been able to compare it with the very fine series of *horsfieldi*, obtained at Tasikmalaja, Java, by Mr. Shortridge during the Balston Expedition. Bornean specimens which may be considered as representing *L. carinatae*, Miller, have the skull more like that of *L. peshwa*, but have markedly shorter fur.

Leuconoe taiwanensis, Arnb. Chr. L.

A specimen recently obtained from Lake Palti, Tibet, proves quite similar to two co-types of the above *Leuconoe* from Formosa.

Lake Palti is comparatively so near the Indian frontier that I think it advisable to include the species in these notes.

Leuconoe dryas, K. And.

Myotis dryas, K. Anderson, Ann. Mus. Genov. (3) III., p. 37-1907. Andaman Island.

Leuconoe longipes, Dobs.

Syn. *Vesputilio megalopus*, Dobs. (see above).

Besides the characters detailed by Dobson and Blanford, *L. longipes* is at once distinguishable from its allies by the small size of the skull, only 14 mm. in length and 7 mm. across the brain case.

B.—SOME NOTES ON THE VIVERRINE GENUS *Hemigalus*.

BY OLDFIELD THOMAS.

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Among the specimens obtained for the Survey by Mr. Shortridge in the extreme south of Tenasserim are two adult examples of the handsome banded Viverrine on which the genus *Hemigalus* (commonly misquoted as *Hemigale*) was founded, thus adding to the Fauna of British India a genus not hitherto known to occur there. Elsewhere *Hemigalus* ranges over the Malay Peninsula, Sumatra (including the Pagi Islands) and Borneo, but does not extend into Java.

On looking into the question of the proper technical name of the animal I find that it has almost always been known by the wrong specific name, in addition to the erroneous use of *Hemigale* for *Hemigalus*.

From the synonymy which follows it will be seen that the commonly used name *hardwickii* was invalid from the first, having been previously used for another animal, that the next author who wrote about it—Jourdan—used no Latin specific names, though he gave the genus name *Hemigalus*, and that therefore Gray's name of *derbianus* is the first available, and should accordingly be used.

Hemigalus derbianus, Gray.

Viverra hardwickii, Gray, Spic. Zool., pt. II., p. 9., 1830 (Malacca) *nec Viverra hardwickii* (misprinted *hardwichii*), Less. Man. Mamm., p. 172, 1827.

Hémigale zébré, Jourd., C. R. v., p. 442, Sept. 1837 (no Latin specific name).

*Pardoxurus derbyanus**, Gray, Charlw. M. N. H., I., p. 599, Nov. 1837 (no locality).

Paradoxurus (?) *zebra*, Gray, l. c., Nov. 1837 (based on Jourdan's specimen)

Paradoxurus derbianus, Gray, P.Z.S., 1837, p. 67 (pub. Jan. 22, 1838—see P.Z.S., 1893, p. 437). (Malay Peninsula.)

Viverra boiei, Müll., Tijdschr. Nat. Ges., v., p. 144, 1838. (S. E. Borneo.)

Hemigalus or *Hemigale hardwickei* auctorum.

*The spelling of the specific name may be taken as Gray first wrote it—for the P.Z.S. of June, 1837—as this was the spelling he afterwards used, even though it was not the first published. The *derbianus* may be looked upon as a misprint, corrected by its author.

The original *H. derbianus* was said to be from the Malay Peninsula, and on comparing the type (B. M. No. 55. 12. 24. 540, received from the Zoological Society's Museum) with two examples from Johore and Malacca, I find that it agrees remarkably with them in the character of its markings. On the other hand, the two Tenasserim specimens, quite like each other, show a considerable difference from the Malay examples both in pattern and in certain cranial characteristics, and may be looked upon as representing a special subspecies.

Hemigalus derbianus incursor, subsp. n.

Size as in true *derbianus*. Ground colour of back rather lighter and more silvery. Dark markings of nape and shoulders broad, well defined and continuous, those of true *derbianus* being very much broken up; the longitudinal bands continuous with the transverse shoulder bands and only broken by the median light band, which has a small band crossing it on the withers. Other markings apparently as in *derbianus*.

Skull in general as in *derbianus*, but the bullæ larger and more swollen anteriorly, not running forwards to a point, but nearly as broad in front as behind, and forming a rounded oblong instead of a round-cornered triangle.

Teeth rather small; canines slender; inner lobe of p^3 much less developed than in any of the other available specimens of the genus.

Dimensions of the Type, measured in the flesh:—

Head and body 520 mm.; tail 393; hindfoot 85; ear 37.

Skull, condylo-basal length 99; zygomatic breadth 46.5; palatal length 52.5; front of canine to back of m^3 39.5; p^3 6.2 \times 3.6; p^4 7.2 \times 5.6.

Hab.—S. Tenasserim. Type from Bankachon, Victoria Province.

Type.—Adult male. B. M. No. 14, 12. 8. 115. Original number 4723. Collected 13th January 1914 by G. C. Shortridge. Presented to the National Museum by the Bombay Natural History Society.

The differences in the colour pattern, the size and shape of the bullæ and the development of the inner lobe of p^3 together seem to indicate that the Tenasserim form is subspecifically distinct from that of the Malay Peninsula. Whether the Bornean form—which would have the name *boiei*—should also be distinguished from *derbianus* I am not at present able to say.

NOTES ON THE INDIAN TIMELIIDES AND THEIR ALLIES

(LAUGHING THRUSHES, BABBLERS, &c.)

BY

LT.-COL. H. H. HARRINGTON, Indian Army.

Part IV.

Family—TIMELIIDÆ.

Group VIII—(*continued*).

SIVA, Hodgson, 1838.

Oates, F. B. I., i., p. 207.

"Siva are birds of handsome plumage. The bill is about half the length of the head, gently curved and notched; the rictal bristles are long, and the nostrils are covered by a membrane; the head is crested. The tail-feathers are very peculiar, the ends being obliquely truncated, and only the two outer pairs are graduated, the other four pairs being of equal length." (Oates.)

Their wings are roundish, the first three primaries graduated, and the 4th, 5th and 6th equal and longest; wing and tail about equal in length; and they have no hairs overhanging the nostrils.

Their range is along the Himalayas, through Burma and Assam to China and the Malay Peninsula.

KEY.

Oates, F. B. I., i., p. 208.

- | | | | | |
|-----------|-------------------------|----|----|-------------------------------------|
| <i>a.</i> | Primaries edged, orange | .. | .. | <i>S. strigula</i> and sub-species. |
| <i>b.</i> | „ „ blue | .. | .. | <i>S. cyanuroptera</i> „ |

SIVA STRIGULA, Hodgson.

Siva strigula, Hodgson, Ind. Rev., 1838, p. 89; Sharpe, Cat., B. M., vii, p. 638; Oates, F. B. I., i., p. 208.

Siva strigula and sub-species.

Description.—Lores spotted black and white; a ring of yellowish-white feathers round the eye; forehead and crown orange-brown with an olive tinge; upper plumage slaty-green; middle tail feathers basal half chestnut-red, the end black, tipped white; the others with an increasing amount of yellow on the outer web and tipped yellow, the outermost nearly all yellow; primary coverts black; primaries and secondaries black, outer edge orange at the base, changing to yellow at the ends; tertiaries, chiefly slaty-grey on the outer webs, black on the inner, and tipped with white; ear-coverts speckled greyish to speckled blackish; chin orange; throat white tinged with yellow, and with crescentic black cross bars; a narrow moustachial stripe, and a patch on each side of the head, black; remainder of under plumage yellowish tinged with olive, olivaceous on the flanks.

“Upper mandible dark brown ; lower light greyish-brown ; legs and feet grey ; iris dark reddish-brown.” (Hume.)

Birds from Simla are much lighter above than the Sikhim ones.

Birds from the Western Himalayas to Darjeeling have the black at the end of the two central feathers from 23 to 35 mm. in extent from the whitish tip. Sides of the head greyish. Wing, 68-69 mm. Culmen, 12 mm.

*SIVA STRIGULA CASTANEICAUDA, Hume.

Hume's Siva.

Siva castaneicauda, Hume, Str. Feathers, v., p. 100 (1877); Sharpe, Cat., B. M., vii., p. 639; Oates, F. B. I., i., p. 209.

I do not think this a very good sub-species nor does its geographical distribution lead one to expect this. Oates gives it as from Bhutan, the hills east of Toungoo, and Tenasserim. I find that birds from the following localities vary as follows:—

Bhutan and Assam.—Sides of the head darker than the Himalayan birds, the black at the end of the tail from 14-23 mm. in extent. Wing, 68-69 mm. Culmen, 12 mm.

Chin Hills.—Sides of the head similar to the Assam birds; wing and culmen also the same; the black at the end of the tail 13-19 mm.

Yunnan and the Shan States.—Sides of the head darker than the Assam and Chin Hills birds; wing and culmen the same; the black at the end of the tail 10-16 mm.

Tenasserim.—Sides of the head the same as the last; the black at the end of the tail 15-20 mm.

SIVA CYANUROPTERA and sub-species.

KEY (i).

A.—Under plumage vinous grey.

a. Upper plumage light ochraceous *S. c. cyanuroptera*.

b. „ „ olive-brown, tinged fulvous. *S. c. wingatei*.

B.—Under plumage white.

c. Forehead blue, indistinctly striped.

a' Upper plumage fulvous olive-brown .. *S. c. oatesi*.

b' „ „ dusky olive-brown .. *S. c. sordida*.

d. Forehead brown, with obsolete stripes *S. c. sordidior*.

~ S. STRIGULA MALAYANA, Hartert.

Hartert, Nov. Zoo., ix. (1902), p. 567.

Differs from *S. strigula* from Nepal and Sikhim as follows. The crown is not so bright orange-brown, but is duller, darker, more olive-brown. The chestnut colour on the central rectrices extends over about 5/6 of the inner and 4/5 of the outer webs, and the next two pairs are more or less chestnut on the inner webs. The outer pair of rectrices, instead of being yellow with a black base, are black with the tip yellow for about 1 cm. and the outer and inner webs bordered with yellow, except at the base. In most of these characters the new Malayan sub-species agrees with *S. strigula castaneicauda*. It differs, however, from both *S. strigula* and *S. s. castaneicauda* in its sombre colour; the under surface being yellowish-olive, only an ill-defined central line remaining orange-yellow. The undertail-coverts are dull yellowish-olive, instead of yellow. The crown is dark olive-brown.

Wing, 68-69; tail, 70-72; tarsus, 26; bill, 11½ m.

Habitat.—Malay Peninsula.

KEY—(ii).

—	<i>cyanuroptera.</i>	<i>wingatei.</i>	<i>oatesi.</i>	<i>sordida.</i>	<i>sordidior.</i>
<i>Locality</i> ..	Himalayas to the Chin Hills.	Yunnan, Bhamo Hills, and Shan States.	Byingyi Mt. ..	Tenasserim ..	The Malay Peninsula.
<i>Colour of the under parts.</i>	Grey, with a vinous tinge.	Grey with a vinous tinge.	White. ..	White. ..	White. ..
<i>Upper plumage.</i>	Bright ochraceous.	Olive-brown with a fulvous tinge.	Olive-brown with a fulvous tinge.	Dusky earthy brown.	Dull sooty-brown.
<i>Head</i>	Blue, stripes very distinct.	Blue, stripes very distinct.	Blue, stripes indistinct.	Blue, stripes indistinct.	Sooty-brown, stripes obsolete.
<i>Wings</i>	Primaries edged dark blue, the secondaries edged light blue and tipped white.	Primaries edged dark blue, the secondaries edged light blue but not tipped with white.	The edging of the primaries and secondaries the same, a dark blue.	The same as <i>oatesi</i> .	

SIVA CYANUROPTERA CYANUROPTERA, Hodgson.

Hodgson's Blue-winged Siva.

Hodgson, Ind. Rev., 1838, p. 88 ; Sharpe, Cat., B. M., vii., p. 640 ; Oates, F. B. I., i., p. 209.

Description.—Lores, round the eye, and a short supercilium, white; feathers of forehead and crown, with black shafts and whitish edges, the whole washed with blue, some specimens show the white markings on the forehead more distinctly than others, which have a very blue appearance ; nape blue ; the stripes above the eye more pronounced and bluer ; upper-back tinged with bluish or lavender-grey ; lower-back, rump, and upper tail-coverts bright fulvous tinged with ochraceous, brightest on the rump and upper tail-coverts ; middle tail feather slaty-grey, edged with blue on the outer web, a subterminal black band and tipped with white ; the next four pairs of feathers with outer web blue, the inner margined with white : the outermost pair margined black and entirely white on the inner web ; primary coverts black ; winglet cobalt-blue, and tipped white ; primaries cobalt-blue on the outer web ; *secondaries pale blue on the outer web, and tipped white* ; tertiaries black on the inner web, and fulvous changing to lavender-grey on the outer edge, *and tipped white* ; chin, throat, breast, ear-coverts and sides of the head, vinous-grey ; flanks darker and tinged with buff ; under tail-coverts white. Wing 62-64 mm., tail 68 mm., tarsus 25 mm., culmen 12 mm.

Note.—Birds from the Chin and Naga Hills are slightly larger than Himalayan ones, and are much bluer on the head, and have much less white on the inner webs of the tail feathers, and more fulvous on the tertiaries. Wing, 65-70 mm.

“Bill, grey-horny, brownish about the nostrils, and the base of the lower mandible, yellow ; iris, brown ; feet, fleshy.” (Oates.)

Distribution.—The Himalayas from Naini Tal to Assam, Manipur, the Naga and Chin Hills.

Habitat and Nesting.—[The blue-winged Siva builds a nest which is a small, neat edition of that of *Liothrix lutea* ; that is to say it is a small cup made of leaves, grasses, moss and roots, lined with very fine roots and fine

grasses usually of a very dark colour. The majority of nests are found placed in bushes low down, not more than four or five feet from the ground but others may be taken quite high up in tall trees. Wherever it is placed the nest is well hidden, in this respect being very unlike that of the *Liothrix* which likes its nest to be seen by all the world. For this reason in some places, such as the Khasia Hills, although the birds are equally common only one nest of *Siva* may be found to ten or twenty of the *Liothrix*.

In number the eggs vary from 2 to 4, the latter number being most exceptional, two perhaps the most common. The normal egg is a bright pale green-blue in ground colour much the same as that of the Song Thrush, and the markings consist of a very few specks and dots of black or, more rarely, brown or red brown, about the larger end. This type of egg is like that of many of the finches of the *Propasser* group. Other eggs are much paler in ground colour, some indeed practically white and some of the largest eggs of this type or much like small, glossless, eggs of *Minla* and *Liothrix*, but the texture is always softer and less glossy.

In shape they are rather regular ovals, very little compressed towards the smaller end.

They average in size about $\cdot 70'' \times \cdot 52''$ —E. C. S. B.]

SIVA CYANUROPTERA WINGATEI, O. Grant.

The Yunnan Blue-wing Siva.

Siva wingatei, O. Grant, Bull., B.O.C., x., p. 38 (1900); *ibid*, Ibis, 1900, p. 593; Ingram, Nov. Zool., xix., p. 290.

Description.—"Intermediate between *S. cyanuroptera* and *sordida*, resembles the former in the colour of its upper plumage, but is a more olive-brown tinged with fulvous, instead of ochraceous; and differs from that species and resembles *sordida* in *not having the quills of the wing, either white tipped or white margined*." In the type the winglet is not tipped with white, but this does not hold good with all specimens from Yunnan and the Shan States. Under plumage as in *cyanuroptera*, a vinous grey.

Wing, 66 mm.; tail, 65 mm.; tarsus, 24 mm.; culmen, 13 mm. (Type).

Distribution.—This is a very good sub-species, and has a very extended area; being found from Yunnan to the Bhamo Hills, and the Shan States; birds from the south and the neighbourhood of Fort Stedman show very little signs of striping on the head.

[I have eggs from the Shan States presumably of this sub-species. They are exactly like the blue type of *cyanuroptera* already described—E.C.S.B.]

SIVA CYANUROPTERA OATESI, Harington.

Oates' Siva.

Bull., B.O.C., xxxiii., p. 62 (1913).

Description.—"In the British Museum there are three specimens of a *Siva* collected by the late E. W. Oates, on Byingyi, an isolated hill of 6,200 feet, situated on the edge of the Shan Plateau ('Ibis,' 1894, p. 481).

These three birds are quiet distinct from *S. sordida*, Hume, from Tenasserim, of which there is only one specimen, the type, in the British Museum. The other specimen, from Karennee, which has been referred to that species, differs in the colour of its head.

Adult.—Intermediate between *S. c. wingatei*, O. Grant, from Yunnan and *S. c. sordida*, Hume, from Tenasserim. It resembles the former in the colour of its back and upper plumage in general, being of an olive-brown tinged with ochraceous on the rump, but differs from that species in having the head almost entirely dull blue, showing only faint indications of stripes, which are so conspicuous in *S. c. wingatei*. It resembles *S. c. sordida* in the colour

of its under plumage, which is white, while in *S. c. wingatei* these parts are pale grey with a vinous tinge.

Habitat.—Byingyi Mountain.

Type in the British Museum: Adult. Mt. Byingyi, iii., 94. “E. W. Oates’ coll.” (Harington).

SIVA CYANUROPTERA SORDIDA,* Hume.

The Dull Siva.

Siva sordida, Hume. St. F., v., p. 104 (1877); Sharpe, Cat., B. M., vii., p. 641; Oates, F. B. I., i., p. 210.

Description.—“Resembles *S. C. cyanuroptera*. Differs in having the back, scapulars, wing-coverts, and the outer edge of the tertiaries earth-brown, not ochraceous; *the winglet is not tipped with white, nor have the quills of the wings either white tips or white margins*; the blue portions of the plumage are much duller.” (Oates.)

“Lower mandible, legs, feet and claws whity-brown; upper mandible darker, but still pale brown; iris creamy-white.” (Oates.)

There is only one specimen, the type, from Tenasserim, in the Museum, this has the whole under plumage white instead of vinous-grey, the upper back washed with dusky blue, and the inner web of only the outermost tail feather white, the others only tipped with white. The secondaries edged the same colour as the primaries, and not pale blue. Type, male: wing, 62 mm.; tail, 68 mm.; tarsus, 25 mm.; culmen, 14 mm.

Habitat.—Muleyit Mt., Tenasserim.

LIOPARUS, Oates, 1889.

“*Lioparus* differs from *Schœniparus* and *Sittiparus* (*Pseudominla*) by having numerous hairs overhanging the nostrils, and from *Proparus* by its long rictal bristles, which reach nearly to the tip of the bill, by its broader bill, and by its smaller hind claw, which measures much less than the hind toe.” (Oates.)

It has the following characteristics: wing not particularly rounded, the first three primaries graduated; wing and tail about equal, the two outer tail feathers only graduated; nostrils, oval and exposed, and not covered by a membrane; bill small and broad; nostrils overhung by numerous small hairs; rictal bristles well developed; hind toe longer than bill.

LIOPARUS CHRYSÆUS, Hodgson.

The Golden-breasted Lioparus.

Proparus chrysæus, Hodgson, in Gray’s Zool. Misc., p. 84 (1844).

Alcippe chrysæus, Sharpe, Cat., B. M., vii., p. 627.

Lioparus chrysæus, Oates, F. B. I., p. 174.

Description.—Lores, forehead, crown, nape, dull black; a ring round the eye, cheeks, and ear-coverts, silvery grey; back, dark ashy with a faint olive tinge; rump and tail-coverts tinged greenish; tail blackish; outer edges of basal two-thirds of tail edged orange; wings blackish, the outer edge of first primaries yellow, inner black; secondaries broadly margined with orange and tipped with white; inner web tertiaries margined white; chin blackish; throat silvery ashy brown; remainder of under plumage bright orange-yellow.

*SIVA CYANUROPTERA SORDIDIOR, Sharpe.

Sharpe, P. Z. S., p. 438, 1887, *ibid*, P. Z. S., p. 276, 1888.

Wings. 59-62 mm.; tail, 75 mm.; tarsus, 23 mm.; culmen, 13 mm.

Habitat.—The mountains of the Malay Peninsula.

Bill, plumbeous; legs, pale fleshy; iris, brown (Jerdon); wing, 50-54. mm.; tail, 50 mm.; culmen, 9 mm.; tarsus, 23 mm.

Distribution.—Nepal to East Naga Hills and Manipur.

PROPARUS, Hodgson, 1841.

Fulvetta, David & Oustalet, Ois. Chin., p. 220 (1877.)

Proparus, Oates, F. B. I., i, p. 173.

These are a very distinct group of small birds, which only occur at high elevations, and are consequently very local in their distribution. They extend along the Himalayas, from Simla to the higher ranges of Manipur and Burma, and into Yunnan, China and Formosa.

Proparus have the following characteristics: a short rounded wing, the first four primaries graduated; wing and tail about equal, the latter graduated, and in some species rounded at the tips, and in others pointed; a small compressed bill; nostrils covered by a membrane, and overhung by numerous small hairs, and short rictal bristles; particularly long tarsus, and a hind claw as long as the hind toe; plumage remarkably soft and dense; the outer edge of the wing feathers brightly coloured.

In habits they appear to be remarkably Tit-like, going about in small parties, hunting trees and bushes for insects. The nesting of two species only, I believe, have been recorded, the nest being a compactly made cup of grass and leaves, felted with moss, and thickly lined with hair and placed in bushes about four feet from the ground. The eggs are a pale green with sepia markings.

“*Hill-Tits*” is a misnomer for this family, as they have nothing in common with the True Tits (*Parinæ*), and therefore I propose the name “*Fulvetta*.” We have adopted many other Latin names such as “*Alcippe*, *Siva*,” etc., as there are no English ones which are applicable.”

KEY TO THE SPECIES OF *Proparus*.

Harington, B. B.O.C., xxxiii., p. 59.

A.—A white supercilium.

a. Ear-coverts chestnut or brown.

*a*¹. White supercilium commencing above the eye.

*a*². Crown reddish-brown, bordered on the sides of the occiput with black .. *P. v. vinipectus*.

*b*². Crown dull chestnut, bordered on the sides of the occiput with reddish-brown *P. v. austeni*.

*b*¹. White supercilium commencing at the base of the bill *P. v. ripponi*.

b. Ear-coverts black. *P. v. bieti*.

B.—No white supercilium.

c. Crown chestnut.

*c*¹. Crown bright chestnut, indistinctly bordered with black on the sides .. *P. v. ruficapillus*.

*d*¹. Crown dull chestnut, distinctly bordered with black on the sides, *P. v. sordidior*.

d. Crown grey, tinged with pinkish-brown; mantle brown. *P. v. cinereiceps*.

e. Crown brown.

*c*² Mantle brown, like the crown.

*a*³. Rump brown or tinged with olive.

*a*⁴. Outer webs of inner primary and secondary quills deep black .. *P. guttaticollis*.

- b*⁴. Outer webs of inner primary and secondary quills reddish-brown .. *P. striaticollis*.
*b*³ Rump dull ochraceous-orange.
*c*⁴. Area in front of the eye pale pinkish-brown; flanks and sides of the belly dull ochraceous-orange, like the rump *P. manipurensis*.
*d*⁴. Area in front of the eye blackish; flanks and sides of the belly dull brownish-orange, paler than the rump *P. formosanus*.
*d*². Mantle dark chestnut, contrasting with the brown of the crown *P. fucatus*.

Distribution.—*Proparus vinipectus*, Hodgson, Simla, Nepal, and Sikhim; *P. austeni*, O.-Grant, Japvo Peak, Naga Hills; *P. manipurensis*, O. Grant, Owen Kulno Peak, Manipur Hills; *P. ripponi*, Harington, Mt. Victoria, Chin Hills, Burma; *P. sordidior*, Rippon, Yunnan, E. of Talifu; *P. bieti*, Oustalet, S. and W. Yunnan; *P. ruficapillus*, Verreaux, Kansu and N. W. Szechuan, China; *P. cinereiceps*, Verreaux, Kansu and N. W. Szechuan, China; *P. fucatus*, Styan, Ichang, China; *P. striaticollis*, Verreaux, N. W. Szechuan; *P. guttaticollis*, La Touche, Kuatun, Fohkien, China; *P. formosanus*, O. Grant, Formosa.

PROPARUS VINIPECTUS VINIPECTUS, Hodgson.

Hodgson's Fulvetta.

Siva vinipectus, Hodgson, Indian Review, 1838, p. 89.

Alcippe vinipectus, Sharpe, Cat., B. M., p. 619.

Proparus vinipectus, Oates, F. B. I., i., p. 173.

Description.—Lores, dusky; forehead, crown and nape, reddish-brown, a broad white supercilium from just above the eye to the nape, bordered above by a black line on each side of the head which converge together upon the upper back. Back brown with a vinous tinge; rump, wing and upper tail-coverts ferruginous; tail brown washed with rusty-red on the outer webs; primary coverts chestnut; the earlier primaries edged with bluish-grey; the others edged with black, secondaries ferruginous on the outer web; ear-coverts and cheeks like the crown; chin, throat and upper breast whitish with dusky streaks, sides of the breast like the back but paler; abdomen and under tail-coverts dark fulvous. "Bill and legs fleshy brown, iris dark brown to pale ochre; legs and feet livid."

Average of eight specimens, 58 mm., max., 60 mm., min., 57 mm. Females slightly the smaller; tail, 54 mm.; culmen, 10 mm.; tarsus, 25 mm.

Distribution.—Simla, Nepal, Sikhim and Darjeeling.

Note.—Birds from the Western Himalayas (Simla) show a want of markings on the throat, and have the head more brightly coloured, whether this is seasonal or not, it is impossible to say from few specimens in the British Museum.

PROPARUS VINIPECTUS AUSTENI, O. Grant.

Grant's Fulvetta.

Proparus austeni, O.-Grant, Bull., B. O. C., v., p. 3 (1895); *ibid*, Ibis, 1896, p. 61; Blanford, F. B. I., iv., App., p. 479.

Description.—Similar to *P. vinipectus*, differs in having head dull chestnut and the stripes on the head reddish-brown; chin and throat white; feathers on the throat white with reddish-brown spots. Wing, (Type) 60 mm.; tail, 53 mm.; culmen, 9 mm. Bill in dried skin intensely black.

Habitat.—Japvo Peak, Naga Hills, Assam.

* *PROPARUS VINIPECTUS RIPPONI*, Harington.

The Chin Hill Fulvetta.

Proparus ripponi, Bull., B. O. C., xxxiii., p. 59 (1913).

Description.—Adult: Similar to *P. austeni*, O. Grant, but differs in having the white supercilium commencing at the base of the bill, and not above the eye; the ear-coverts chocolate-brown and of almost the same shade as the head, instead of very dark brown contrasting with the head. Culmen, 9 mm.; wing, 51-55; tail, 54.

Habitat.—Mt. Victoria, Chin Hills, Burma.

Observation.—There are numerous examples of this bird, collected by Colonel Rippon, in the above locality.

Type in the British Museum: Adult, Mt. Victoria, 19, iv., 04. G. Rippon coll.

* *PROPARUS VINIPECTUS BIETI*, Oustalet.

Oustalet's Fulvetta.

Oustalet, Ann. Sci. Nat. (7), xii. p. 304 (1892).

Lores and a conspicuous supercilium to the nape white; the feathers in front of the eye speckled with brownish; above the supercilium two black lines on each side of the head to the nape; ear-coverts, cheeks, and side of the head black, the cheeks edged posteriorly with dark chocolate; forehead, crown, nape and upper back dark earthy-brown with a vinous tinge; lower back, rump and tail coverts ferruginous; wings and tail as in *vinipectus*; chin and throat white; breast vinous grey; abdomen and flanks tinged olivaceous.

Average wing of eight specimens, 59 mm., max. 61. mm., min. 57. mm. Tail, 55 mm.; culmen, 9 mm.

"Iris, light yellow, bill horny colour. Legs and feet pale fleshy." (Rippon.)

Distribution.—South and West Yunnan. The "Hand List" gives Ta Tibet Tsienlou as a habitat.

PROPARUS RUFICAPILLUS RUFICAPILLUS, Verreaux.

Verreaux's Fulvetta.

Siva ruficapilla, Verr., N. Arch. Mus. VI, p. 37 (1870).

Fulvetta ruficapilla, Sharpe, Cat., B. M., vii., p. 629.

Lores and forehead ashy grey; crown and nape chestnut; back vinous ashy; rump and tail-covert bright ochraceous; tail brownish; outer webs the same colour as the rump; the outer webs of the earlier primaries bluish-ashy, the later ones margined with black; primary coverts the same colour as the rump, a ring or white feathers round the eye; ear coverts pale vinous-brown; chin and throat white with indistinct greyish stripes; breast vinous ashy; flanks and abdomen bright fulvous. Female, slightly duller in colouring. Wing: male, 57 mm.; female, 51 mm.; tail, 52 mm.; culmen, 9 mm.; tarsus, 24 mm.

"Iris hazel, bill light brown-yellowish at the base, feet and claws obscure grey." (Sharpe.)

Habitat.—China, West Szechuen and S. Chensi. The only two specimens in the Museum are from Kan-su.

Note.—The tail feathers of this species are pointed.

PROPARUS RUFICAPILLUS SORDIDIOR, Rippon.

Rippon's Fulvetta.

Rippon, Bull., B. O. C., xiii., p. 60 (1903).

Similar to *P. ruficapillus* but duller.

Lores, and in front of the eye greyish, a white ring round the eye; forehead, crown and nape, dull chestnut; a black stripe on each side of the head, with an indistinct greyish supercilium below; ear-coverts greyish-brown; back olive-grey; rump fulvous; outer edge of tail feathers the same; chin and throat greyish with indistinct stripes; breast vinous-grey; flanks and abdomen pale fulvous; outer edge of first primaries bluish-grey, inner black.

Wing, 53-57 mm.; culmen, 9 mm.; bill, brownish; tail, 54 mm.; tarsus, 22 mm.

Legs and feet light flesh. Bill brown, darkest on culmen.

Habitat.—Yunnan, China, Gyi-dzin-shan. east of Talifu, W. Yunnan, 9,100 ft.

† *PROPARUS MANIPURENSIS*, O. Grant.*The Manipur Fulvetta.**Proparus manipurensis*, O. Grant, Bull., B. O. C., vol. xvi., p. 123.Differs from *vinipectus*, in having no conspicuous white supercilium.*PROPARUS CINEREICEPS*, Verreaux.*The Grey-headed Fulvetta.**Siva cinereiceps*, Verr. W. Arch., Mus., vi, p. 37 (1870).*Fulvetta cinereiceps*, Sharpe, Cat., B. M., vii., p. 628.

Description.—Lores, forehead, crown and nape, grey tinged with pinkish-brown; back, pale brown, rump and tail-coverts olive-yellow, outer edges of tail feather dark grey edged with olive; the earlier primaries edged ashy-blue, blackish on the later; wing-coverts same colour as rump; chin, throat, sides of the neck and breast, vinous-grey; throat with indistinct stripes of greyish; flanks ochraceous. Female, similar to male.

Wing: in male, 61 mm.; female, 57 mm.; tail, 55 mm.; culmen, 9 mm.; tarsus, 25 mm.

Iris light yellow; bill black; feet ashy rufous.

Habitat.—China, W. Szechuan, S. Shensi.

The only two specimens in the Museum are from S. Kansu.

PROPARUS STRIATICOLLIS, Verreaux.*Siva striaticollis*, Verr, N. Arch. Mus., vi., p. 38 (1870).*Fulvetta striaticollis*, Sharpe, Cat., B.M., vii., p. 629.

Description.—I have not been able to examine a specimen of this species so quote Dr. Sharpe's description.

"Upper parts of the body olive-brown, becoming greyish on the neck, marked with blackish stripes on the head and nape; lower surface of body silk grey, striped with blackish on the throat, and with an olive shade on the flanks; lores black; tail greyish, slightly rounded; wings brown edged with ashy grey on the remiges, with black on the secondary quills, and with olive on the tertiaries. Iris yellowish-white; bill brownish-grey on the upper mandible and whitish on the lower one; feet and claws grey." Total length, 4·8"; tail, 2·5"; wing, 2·5"; tarsus, 9"; bill front 2·5".

Habitat.—Moupin, W. China. (Sharpe).*PROPARUS GUTTATICOLLIS*, De La Touche.

De La Touche, Bull., B. O. C., vi., p. 50 (1897).

Description.—Similar to *P. striaticollis*.

Lores, and round the eye and ear-coverts greyish; forehead, crown, nape and back brownish; an indistinct darker stripe on each side of the nape; rump tinged with fulvous; tail brownish with darker outer edges; wing, earlier primaries bluish-grey, later black, chin and throat greyish-white with greyish-brown stripes; breast vinous grey; flanks pale brown.

Wing: male, 57 mm.; female, 53 mm., tail, 53 mm.; bill intensely black, 9 mm., tarsus, 24 mm.

Habitat.—China, N. W. Foh-kien, Kuatun.† *PROPARUS FORMOSANUS*, O. Grant.*Proparus formosanus*, O. Grant, Bull., B. C., xvi, p. 120 (1906.)

Wing, 55 mm.; culmen, 9 mm.; tail, 54 mm.; tarsus, 25 mm.

Habitat.—Mt. Morrison, 9,000 feet, Formosa.*PROPARUS CINERICEPS FUCATUS*, Styan.

Styan., Ibis, 1899, p. 295.

Similar to *P. cinericeps*, Verreaux.

I have not been able to examine any specimens of this sub-species.

			<i>P. cinericeps.</i>	<i>P. fucatus.</i>
Head	...	...	Grey.	Earthy brown.
Back	...	...	Rufous.	Dark chestnut.
Rump, flanks and under-tail coverts	...	...	Olive.	Bright rufous

Habitat.—Ichang, China.

Area in front of eye pale pinkish-brown; forehead, crown, nape and upper back pale brownish with a vinous tinge; a conspicuous chocolate coloured stripe on each side of the head to upper back; lower back, rump, and tail-coverts dull ochraceous orange: the outer edge of the earlier primaries bluish-grey; the later edged black; primary coverts ferruginous, tinged olive; tail brown; the outer edge same colour as back; chin and throat whitish suffused with vinous, spotted with brownish-red; breast vinous-grey; abdomen and flanks dull ochraceous orange, like the rump.

Note.—This interesting little bird has its nearest ally in *P. formosanus*, O. Grant.

Habitat.—Owen, Kulno Peak, Manipur Hills, 8,000 ft.

Four specimens collected by Godwin-Austen.

Wing, 50-56 mm.; culmen, 8 mm.; tail, 47 mm.

GROUP IX.

STACHYRHIS.

In this group I have placed the following: *Thringorhina*, *Stachyrhis*, *Stachyrhidopsis*, *Mixornis*, and *Cyanoderma*.

It consists of a large number of birds, the great majority of which do not occur within Indian limits. If the whole group are examined together they grade almost imperceptibly from one into the other, so much so that it is impossible to draw the line between *Thringorhina* and *Stachyrhis*, many members of the latter being of the same size as those of the former. Of the smaller *Stachyrhis*, of the *S. chrysæa*, Hodgson, type, although being structurally similar to the *S. nigriceps*, type, differ greatly in size and coloration, and I think should be placed in a genus by themselves, as they are being continually transferred from *Stachyrhis*, to *Stachyrhidopsis*, and back again.

Stachyrhis and *Thringorhina* are remarkable for being the only *Timeliidæ* which lay spotless white eggs; and have the following characteristics: tail slightly shorter than the wing; feathers of the forehead stiff; rictal bristles short, and no hairs overhanging the nostrils; a stout conical bill, the culmen curved throughout, and hooked at the tip; and the nostrils covered by a prominent overhanging membrane.

S. chrysæa and sub-species are very much smaller than the above, with a finer bill, and have a very bright plumage in which golden-yellow predominates. They generally lay spotless white eggs, occasionally spotted ones are found.

Stachyrhidopsis is remarkable for its sharp conical bill, both the culmen and the lower edge of the lower mandible being quite straight, and not hooked as in the last two genera. They also lay spotted white eggs.

Mixornis has a very marked resemblance to the last in coloration and style of plumage, its bill, however, is quite different, being gently curved, and the nostrils oval and exposed with no covering membrane.

Cyanoderma is noticeable for its naked orbital skin round the eye. It lays spotted eggs, but I can find nothing recorded about its habits or nidification.

THRINGORHINA, Oates, 1889.

Oates, F.B.I., i., p. 155.

“The two birds for which the above generic name is proposed, in addition to a peculiar style of coloration, are characterised by the very large operculum over the nostril. The bill is very strong, with the culmen gently curved throughout, and the rictal bristles are weak. The feathers of the forehead harsh to the touch.” (Oates.)

They also have a short rounded wing, fitting close to the body; the tail shorter than the wing; and no hairs overhanging the nostrils.

The nidification of only one species appears to be known, this builds a domed nest and lays spotless white eggs. In fact its nest and eggs are similar to those of *Stachyrhis*, and I think, is one very good reason for combining the two genera.

Distribution.—*T. oglui*, Godwin-Austen, Assam; *T. guttata*, Tickell, Tenasserim; *T. striolata*, S. Mull., Sumatra; *T. thoracica*, Temm., Java.

THRINGORHINA OGLUI, Godwin-Austen.

Austen's Spotted-Babbler.

Actinura oglui, Godwin-Austen, J., A.S.B., xlv., pt. ii., p. 42 (1877).

Actinodura oglui, Sharpe, Cat., B.M., vii., p. 467.

Thringorhina oglui, Oates, F.B.I., i., p. 156; Baker, Ibis, 1906, p. 100.

Description.—As in the F.B.I.

Distribution.—Appears to be a very rare bird confined to the higher ranges of the Naga Hills, Assam. The nidification has been described by Stuart Baker, and shortly, it appears to build a large domed nest, and lays three pure white eggs, measuring from $\cdot 86 \times \cdot 63$ to $\cdot 91 \times \cdot 62$ inches.

THRINGORHINA GUTTATA, Tickell.

Tickell's Spotted-Babbler.

Turdinus guttatus, Tickell, Blyth, J., A.S.B., xxviii., p. 414 (1859).

Stachyrhis guttata, Sharpe, Cat., B.M., vii., p. 535.

Thringorhina guttata, Oates, B.I., i., p. 155.

Description.—As in F.B.I.

Distribution.—From Muleyit Mt. to the extreme south of Tenasserim. Another rare bird of which nothing appears to be recorded.

STACHYRHIS, Hodgson, 1844.

Oates, F.B.I., i., p. 161.

Very similar to *Thringorhina*, but not quite such a massive bill. This genus is represented within Indian limits by two species, and their sub-species, *S. nigriceps* and *S. chrysea*. The latter, I think, should be placed in a genus by itself.

Distribution.—*S. n. nigriceps*, Hodgson, Nepal, and Sikhim; *S. n. coltarti*, Harington, Assam, south of the Bramhaputra, the Naga and Chin Hills, the Bhamo Hills, Burma; *S. n. davisoni*, Sharpe, Malay Peninsula, and probably from Tenasserim up to the Shan States; *S. n. lavata*, Bonaparte, Sumatra; *S. n. borneensis*, Sharpe, Borneo; *S. n. natunensis*, Hartert, Natuna Island.

Colouration.—The feathers of the lores and forehead black tipped with white or hoary grey; those of the crown and nape, black or grey, edged with white, giving a striped appearance; in full plumage a conspicuous supercilium of black or dark sooty-brown feathers, edged with grey above and below; ear-coverts brownish; cheeks white; *chin and throat, black, black and white, or grey*; the whole upper plumage olive-brown; the exposed portions of the wings and tail inclined to rufous; lower plumage from fulvous with a yellowish tinge, to rusty-orange.

STACHYRHIS NIGRICEPS NIGRICEPS, Hodgson.

The Nepal Black-throated Babbler.

Stachyrhis nigriceps, Hodgson, Gray's Zool. Misc., p. 83 (1844); Sharpe, Cat., B. M., vii., p. 532; Oates, F. B. I., i., p. 162.

Description.—Lores and forehead black and white; *chin and throat grey formed by the feathers being a dark grey or black edged with white*, giving a slightly mottled appearance; ear-coverts golden-brown. Wing, 58 to 62 mm.; bill, 15 mm. Bill, lower mandible yellowish, upper horn-coloured.

Distribution.—Nepal, Sikhim, Darjeeling.

STACHYRHIS NIGRICEPS COLTARTI, Harington.

The Assam Black-throated Babbler.

Harington, Bull., B. O. C., xxxiii., p. 61 (1913).

Description.—Adult: Similar to *S. nigriceps*, Hodgson, from Nepal, but differs in having the throat very dark grey or black; in *S. nigriceps* the feathers are dark grey edged with white, producing a striped appearance. The measurements are the same as those of *S. nigriceps*.

Habitat.—Dibrugarh, Assam; the Naga and Chin Hills, and the Bhamo Hills. Birds from the Shan States and Tenasserim have the throat light ashy-grey, as in *S. davisoni*, Sharpe, from the Malay Peninsula, with which they appear to be identical.

I have named this sub-species after Dr. H. N. Coltart, who has collected a number of specimens at Margherita, Assam.

Type in the Tring Museum: ♀. Margherita, 4, xii. 01. H. N. Coltart coll.

* STACHYRHIS NIGRICEPS DAVISONI, Sharpe.

The Tenasserim Black-throated Babbler.

Stachyrhis davisoni, Sharpe, Bull., B. O. C., i., p. 7 (1892).

Description.—Chin and throat ashy grey, and not black and white; lores and forehead hoary grey; ear-coverts hair brown; superciliary streak sooty-brown to black, upper plumage tinged with green.

Bill intensely black, bluish below.

Distribution.—The Malay Peninsula, and probably up to Karennee, one specimen procured at Thandunng (now in the Tring Museum) is, I think, referable to this sub-species.

Note.—Birds from the Shan States appear to be this sub-species, but differ slightly as follows: upper plumage with a decided rufous tinge; the chin and throat pale ashy; ear-coverts golden-brown; superciliary streak black with white edges to the feathers and very conspicuous.

Bill bluish to black below, intensely black above.

STACHYRHIS CHRYSÆA.

Colouration.—Lores and in front of the eye, black to yellowish; forehead golden to pure yellow (in *chrysæa* and *chrysops* and *binghami*, a short moustachial streak black); ear-coverts greenish-yellow to the same colour as the head, and slaty-green in *binghami*; crown and nape bright golden yellow to

* STACHYRHIS NIGRICEPS LAVATA, Bonaparte.

Bp. Consp., i., p. 217 (1850); Sharpe, Cat., B. M., vii., p. 534.

Lores grey; head sparingly streaked with white; chin and throat grey; bill black.

Distribution.—Sumatra.

STACHYRHIS NIGRICEPS BORNEENSIS, Sharpe.

Sharpe, Ibis, 1887, p. 449.

Wing, up to 64 mm.; bill, 15 mm., and intensely black.

Distribution.—Borneo.

S. NIGRICEPS NATUNENSIS, Hartert.

Hartert, Nov. Zool., i., p. 470 (1894).

Distribution.—Natuna Island.

The following other species of *Stachyrhis* have been recorded:—

S. melanothorax, Temm., Java.

S. poliocephala, Temm., Malay Peninsula, Sumatra and Borneo.

S. grammiceps, Temm., Java.

S. nigricollis, Temm., Malay Peninsula, Sumatra and Borneo.

S. leucotis, Strick, Malay Peninsula, and Borneo.

S. maculata, Malay Peninsula, Sumatra and Borneo.

S. banjakensis, Richmond, Banjak Island, Sumatra.

dull greenish-yellow, with black streaks; upper plumage and exposed part of the wings, bright olive-yellow to slaty-green; tail greenish-brown washed with yellow on the outer webs; lower plumage bright yellow to dull yellow.

Distribution.—*Stachyrhis chrysæa chrysæa*, Hodgson, Nepal, Sikhim, Assam, and also Kachin Hill, East of Bhamo; *S. c. assimilis*, Walden, S. Shan States and Karennee; *S. c. chrysops*, Richmond, Malay Peninsula and possibly Siam and the Mekong watershed; *S. c. binghami*, Rippon, the Chin Hills; *S. c. bocagii*, Salvadori.

* STACHYRHIS CHRYSÆA CHRYSÆA, Hodgson.

The Nepal Golden-headed Babbler.

Stachyrhis chrysæa, Blyth, J.A.S.B., xiii. p. 379 (1844).

Stachyrhidopsis chrysæa, Sharpe, Cat., B. M., vii., p. 601.

Stachyrhis chrysæa, Oates, F.B.I., i., p. 163.

Description.—Lores and a streak to the eye black; forehead bright orange, feathers of the head distinctly striped with black in the centre; throat from a rich orange to an orange-yellow (birds from N.-E. Assam and Naga Hills brightest); ear-coverts greenish-yellow.

Distribution.—Nepal, Sikhim to Assam, and the Kachin Hills.

STACHYRHIS CHRYSÆA ASSIMILIS, Walden.

The Burmese Golden-headed Babbler.

Stachyrhis assimilis, Walden, Blyth's Birds Burma, p. 116 (1895).

Stachyrhidopsis assimilis, Sharpe, Cat., B. M., vii., p. 602. Oates, F. B. I., i.

Description.—Similar to *chrysæa*, but no black streak in front of the eye; lores greenish-grey; the stripes on the head indistinct and blurred; upper plumage greenish-olive to slaty-green; under parts dull yellow. Birds from the Shan States and Muleyit Mt., Tenasserim, show indications of a black streak in front of the eye and so tending towards *chrysops*.

"Above cinerous olive-green. Feathers of the head yellow with brown central streaks, cheeks and ear-coverts, pale brown tinged with yellow. Entire under surface dilute yellow. Quills, brown edged externally with pale yellow. Rectrices, cinerous-brown tinged with olive-green. Wing, 1.92". Blyth, Birds Burma, p. 116.

Karennee: Male: iris, black; bill lavender, pink at base of mandible, legs brownish-yellow, feet greenish. Female: iris brown, bill dark plumbeous, pink at base of mandible; legs light greenish-brown." (W.R.)

There are four specimens in the British Museum from Nepal and Assam, these are probably the ones referred to by Oates, they are old and faded

* STACHYRHIS CHRYSÆA CHRYSOPS, Richmond.

Richmond, Proc. Biol. Soc., Washington, xv., p. 157 (1902).

This seems to be very near *S. chrysæa*. All the specimens in the Museum are from the Malay Peninsula, and are marked as that sub-species.

Description.—Lores and a black moustacial streak, and under parts like *S. chrysæa*; upper plumage like *assimilis*; the markings on the head not so distinct as in *chrysæa*. Worn specimens are exactly like *assimilis* from Burma.

One bird from Loi Pang Nan, S. S. States near the Mekong, is exactly like the Malay specimens, as this locality is on the borders of Siam, it is probably that sub-species.

STACHYRHIS CHRYSÆA BOCAGII, Salvadori.

Sharpe, Cat., B. M., vii., p. 602, foot-note.

"Above, greenish-olive; head yellowish, the crown streaked with dusky; lores dusky; undersurface of body yellow, the throat brighter, the sides tinged with green; wings and tail dusky ashy grey, the outer margins of the feathers greenish-olive; bill and feet dusky; iris chestnut.

Total length, 4.3"; bill, .45"; wing, 2"; tail, 1.75"; tarsus, .66." (Salvadori).

Habitat.—Mountains of Sumatra.

skins with no data, and look very like *assimilis* from Karennee, but show the black stripe in front of the eye and are in my opinion nothing but faded specimens of *chrysæa*.

Distribution.—Karennee and the S. S. States bordering Karennee, and Byingyi Hill.

STACHYRHIS CHRYSÆA BINGHAMI, Rippon.

The Chin Hills Golden-headed Babbler.

Stachyrhis binghami, Rippon, Bull., B. O. C., xiv., p. 84.

Similar to *chrysæa*, differs in having ear-coverts slaty-green; upper plumage as in *assimilis*; under parts dull orange to dull yellow; the black streak in front of the eye present.

Distribution.—Mt. Victoria, Chin Hills.

STACHYRHIDOPSIS, Sharpe, 1883.

Oates, F. B. I., i., p. 164; O. Grant, P. Z. S., 1900, p. 476; and Ibis, 1907, p. 183; Rothschild, Bull., B. O. C., xiv., p. 8.; Hartert, Nov. Zool., xvii., p. 232.

“This genus differs from *Stachyrhis* in having the culmen perfectly straight, and in laying spotted eggs.” (Oates.)

They have the following characteristics: a short rounded wing; wing and tail about equal in length; the feathers of the forehead soft and not harsh as in *Stachyrhis*; the bill, small, conical; the upper edge of the upper mandible and the lower edge of the lower mandible quite straight, (very similar to that of the Goldfinch); bill not notched; rictal bristles very short; and no hairs overhanging the nostrils, which are protected by a covering membrane.

In style of plumage they are very similar to *Mivornis*, and consequently may be confused with that genus, they can however be easily separated by their bills. In *Mivornis*, the nostrils are oval and exposed, and the culmen curved, whilst in this genus, the nostrils are covered by a membrane, and the culmen perfectly straight.

The members of this genus build retort shaped nests, of bamboo leaves and grass, which are generally well concealed in overhanging tufts of grass. They lay white eggs more or less spotted with reddish-brown.

This is a very confusing genus of small birds which extend from the N. W. Himalayas to China and the islands of Formosa and Hainan, and also into Burma and the Malay Peninsula.

KEY TO SPECIES.

a. Crown rufous to chestnut; chin not black.

a¹. Throat yellowish *S. ruficeps*.

b¹. Throat whitish *S. rufifrons*.

b. Crown fulvous; chin black *S. pyrrhops*.

(For easier comparison I have tabulated the differences between the geographical races of *S. ruficeps* and *S. rufifrons*.)

Distribution.—*S. pyrrhops*, Hodgson, Himalayas, Murree to Nepal; *S. ruficeps ruficeps*, Blyth, Sikhim and Nepal; *S. ruficeps bhamoensis*, Harington, Bhamo and Shan Hills; *S. ruficeps davidi*, Oustalet, Kwang-tung, Foh-kien, Foochoo, Hunan, Szechuen, China; *S. ruficeps præcognitus*, Swinhoe, Formosa; *S. ruficeps goodsoni*, Rothschild, Hainan; *S. rufifrons rufifrons* Hume, Pegu, Shan States, and Tenasserim, Burma; *S. rufifrons ambigua*, sub-sp. nov., Sikhim and Assam; *S. poliogaster*, Hume, Malay Peninsula.

Note.—*S. sulphura*, Rippon, Bull., B.O.C., xi., p. 11 (1900); Harington, Bull., B.O.C., xxxiii., p. 63 (1913), is not a *Stachyrhidopsis*, but *Mixtornis gularis rubricappillus*, this name therefore becomes a synonym of that species.

KEY.
STACHYRHIDOPSIS RUFICEPS and RUFIFRONS, and their sub-species.

	<i>S. r. ruficeps</i> , Blyth.	<i>S. r. bharmoensts</i> , Harington.	<i>S. r. davidi</i> , Oustalet.	<i>S. r. præcognitus</i> , Swinhoe.	<i>S. r. goodsoni</i> , Rothschild.	<i>S. rufifrons</i> <i>rufifrons</i> , Hume.	<i>S. rufifrons ambigua</i> , Sub-sp. nov.
Type locality.	Darjeeling ..	Bhamo Hills ..	Szechuen ..	Formosa ..	Hainan ..	Pegu, Burma ..	Shillong, Assam.
Bill ..	Horn coloured ..	Do. ..	Do. ..	Do. ..	Do. ..	Black ..	Horn-colour.
Lores.. ..	Bright yellow..	Yellowish ..	Do. ..	Bright yellow ..	Yellow ..	Whitish ..	Yellowish.
Crown and Nape ..	Bright rufous, extending over the nape. Black shaft-stripes to the feathers of the forehead, very indistinct or wanting	Bright rufous, confined to the crown. Black shaft-stripes very faint.	Light chestnut, extending to the nape. No black shaft-stripes.	Rich dark chestnut, extending to the nape. No black shaft-stripes.	Rich dark chestnut, which is confined to the crown. Do.	Dull rufous which is confined to the fore part of the head. Black shaft-streaks, indistinct or wanting.	Bright rufous, which is confined to the crown. Black shaft-streaks, very conspicuous.
Upper plumage ..	Olive with a decided greenish tinge.	Greyish-olive with a decided greenish tinge.	Olive with a decided greenish tinge.	Dark greenish-olive.	Dark greenish-olive.	Greyish-olive ..	Olive with a greenish tinge.
Chin	Yellowish with black shaft stripes. The yellow not contrasting with the remainder of lower plumage.	Do. The yellow merging into the breast.	Chin, throat, and breast, yellow. Chin with black shaft-stripes.	Chin, throat, and breast yellow. Chin with black shaft-stripes.	Chin bright yellow, with a few black shaft-stripes.	Chin white with black shaft streaks, the white contrasting with the remainder of the lower plumage.	Chin whitish with black shaft streaks. White not contrasting with but merging into remainder of lower plumage.
Lower plumage ..	A dirty yellowish-buff. Olivaceous on the flanks.	Dull greyish-olive..	Greyish, tinged with olive on the flanks.	Greyish-olive ..	Breast yellowish, flanks and abdomen dark olive.	Tawny buff ..	Fulvous, olivaceous on the flanks.
Probable distribution.	Nepal and Sikkim .. Note.—Two very poor specimens in the British Museum from Manipur are possibly this sub-species. I have seen no typical <i>ruficeps</i> from Assam.	Bhamo and Shan Hills on the east of Burma.	Kwang tung, Fookien, Foochoo, Hunan, Szechuen, China.	Island of Formosa.	Island of Hainan .	The Shan States, Pegu and Tenasserim, Burma.	Assam, Bhutan, and Sikkim. (Note.—Birds from Margherita, Assam, appear to be smaller than the Khasia Hills birds).

STACHYRHIDOPSIS PYRRHOPS, Hodgson.

The Red-billed Babbler.

Stachyrhis pyrrhops, Hodgson, Blyth, J., A. S. B., p. xiii., p. 379 (1844).

Stachyrhidopsis pyrrhops, Sharpe, Cat., B. M., vii., p. 600; Oates, F. B. I. i., p. 165.

Description.—As in Oates, F. B. I.

Distribution.—The Himalayas, Murree to Nepal.

STACHYRHIDOPSIS RUFICEPS and RUFIFRONS.

S. ruficeps and its allied races extend from Nepal eastwards along the foot hills of the Himalayas to Assam and Burma, and from thence into China and the Islands of Formosa and Hainan.

The first of these to be described was *S. ruficeps*, Blyth, 1847, from Darjeeling. In the original description Blyth first compares it with *S. pyrrops*, a bird with a black chin, he then gives description as follows: "*chin and middle of throat white, with slight black central streaks to the feathers; the rest of the upper parts plain olive, and of the lower whitish, with a fulvous tinge on the side of the neck and breast.*" Blyth, J., A. S. B., 1847, p. 452.

The above is almost an exact description of what at present is considered *S. rufifrons*, Hume, originally described from Pegu, Burma, but stated to occur in Sikhim and Assam.

Birds of the above description also occur in the Sikhim Hills, Butan Duars, and Assam, and are evidently birds of low elevation.

The true *S. ruficeps* from Sikhim and Nepal is a very different bird, having *the chin and throat yellow with black shaft stripes, breast and under parts a decided yellow and upper plumage green*, the rufous of the head extending well over the nape.

Jerdon, 1863, also mentions the white chin and throat, but states "underparts fulvous, or dull oil yellow or pale ferruginous," and I think must have been confusing the two species, as *S. rufifrons*, Hume, was not described until 1893, and much later than this was stated to occur in Sikhim.

Since writing the above, on my way through Bombay, I have been able to examine both of Blyth's types of *S. ruficeps*, from Darjeeling. These were kindly forwarded for my inspection by Dr. Annandale from the Calcutta Museum. Both these specimens are very faded, but fortunately the rufous cap on the head is quite conspicuous, and extends well over the nape, so that there can be no doubt that they are what are now considered to be *S. ruficeps*, and not *S. rufifrons* which I considered possible from both Blyth's and Jerdon's description.

However *S. rufifrons*, Hume, from Pegu, differs materially from the so-called specimens from Darjeeling and Assam, for the latter I propose the name *S. rufifrons ambigua*, sub-sp. nov.

As both *S. ruficeps*, and *S. rufifrons* and their geographical races (or sub-species) occur in the same localities, they must be distinct species, (and not the one a sub-species of the other). The former being found at higher elevations than the latter, which appears to be a bird of the plains and low foot hills.

More and fresh specimens of these confusing little birds are required to enable us to form a complete idea of their distribution.

* STACHYRHIDOPSIS RUFICEPS RUFICEPS, Blyth.

The Nepal Red-headed Babbler.

Stachyrhidopsis ruficeps, Blyth, J. A. S. B., 1847, p. 452; Sharpe, Cat., B. M., vii., p. 598; Oates, F. B. I., i., p. 164.

"Allied in form and size to *S. pyrrhops*, Hodgson, J. A. S. B., xiii., p. 379, but having the crown light ferruginous, and the chin and middle of the throat white, with slight black central streaks to the feathers; rest of the upper parts plain olive, and of the lower whitish, with a fulvous tinge on the sides of the neck and breast.

Length of wing two inches and an eighth, and of tail an inch."

"From Darjeeling." (Blyth).

"Description.—Crown of the head light ferruginous, the rest of the upper plumage plain olive; chin and middle of the throat white, with faint black streaks; the rest of the lower parts whitish, with a fulvous tinge on the sides of the neck and breast, or, throughout of dull oil-yellow or pale ferruginous, darkest on the breast, and fading, and becoming dusky towards vent."

"Nepal, Sikhim and Khasia Hills." Jerdon, *Birds of India*, ii., p. 22 (1863).

The above two descriptions are very misleading, so I give the following, taken from the large series in the British Museum:

Lores, bright yellow, crown and nape bright rufous chestnut, the feathers slightly lengthened, and so forming a conspicuous reddish cap to the head; the feathers of the forehead with very indistinct black shaft streaks. Upper plumage olive-brown with a decided rufous tinge. Chin yellowish with decided black shaft streaks. Lower plumage a dirty yellowish-buff, and olivaceous on the flanks.

Bill, horn-coloured; wing, 54—58 mm.

STACHYRHIDOPSIS RUFICEPS BHAMÆNSIS, Harington.

The Bhamo Red-headed Babbler.

Stachyrhidopsis bhamænsis, Harington, Ann. and Mag. of N. H. Ser., 8, vol. ii., p. 245 (1908); J. B. N. H. S., xix., p. 117.

* *Stachyrhidopsis ruficeps davidi*, Oustalet.

S. davidi, Oustalet, Bull. Mus. Paris., 1899, p. 119.

S. sinensis, O.-Grant, Ibis, 1907, p. 184

"Nearest to *S. præcognitus*, Swinhoe and *S. ruficeps*, Blyth, but the back greyish-olive, and breast and abdomen ashy, not yellow." (Oustalet).

Habitat.—Szechuen.

"Crown light chestnut, which does not extend over the nape, and without black shafts to the feathers; upper parts cold greyish-olive; throat yellowish; middle of breast and belly pale whitish-olive, and flanks greyish-olive." (O.-Grant.)

Habitat.—China.

Note—I cannot find any difference between the numerous specimens from China, therefore *S. sinensis*, O.-Grant, will be a synonym of *S. davidi*, Oustalet.

Stachyrhidopsis ruficeps præcognitus, Swinhoe.

Swinhoe, Ibis, 1866, p. 310.

Habitat.—Formosa.

Stachyrhidopsis ruficeps goodsoni, Rothschild.

Rothschild, Nov. Zool., xvii., p. 232.

Habitat.—Hainan.

Description—"Adult male. Resembles *S. sinensis*, Grant; (*S. r. davidi*, Oustalet) in having the light chestnut on the head confined to the crown and not extending over the nape, but may be easily recognised by its much larger and more massive bill. It differs in having faint black shaft-streaks to the feathers of the forehead, the throat less yellow, much the same colour as the breast, which is a dull greyish-olive, and the sides of the head and neck grey instead of yellowish." (Harington).

"Total length, about 4·6 inches; exposed part of the culmen, 0·5; wing, 2·1; tail, 2·2; tarsus, 0·8."

"Adult female. Similar to the male. Wing, 52-55. mm.

Distribution.—The Bhamo hill tracts, and Southern Shan States. The nesting has been described by me in the Journal. The eggs are a pure white with a few pale red spots and average $\cdot 65 \times \cdot 52$ inches.

STACHYRHIDOPSIS RUFIFRONS RUFIFRONS, Hume.

Humes' Babbler.

Stachyrhidopsis rufifrons, Hume, Str. Frs., iii., p. 479 (1873); Sharpe, Cat., B. M., vii., p. 599; Oates, F. B. I., i., p. 165.

"Closely allied to *S. ruficeps*, but smaller, wing 1·9", bill at front $\cdot 05$ ", tarsus $0\cdot 67$ ". The rufous of the head duller, and not extending to the occiput. Upper surface wanting the strong greenish-olive tinge, and the lower surface wanting the oil yellow tinge of *ruficeps*." (Hume.)

Note.—The type is in the British Museum, it is an immature and badly damaged specimen, fortunately Mr. J. P. Cook collected three birds in the Pegu Yomas, the locality from which the type was procured, these are now in the Tring Museum, and from which I have taken the following description.

Lores, white with black tips to the feathers; crown, dull rufous, which is confined to the crown; the feathers have faint indications of black shaft-stripes; chin and throat, *white* with black shaft-stripes; *whitish* on the breast; flanks and abdomen, a rich tawny buff; upper plumage greyish olive.

Wing: 49, 50, 50 mms.

STACHYRHIDOPSIS RUFIFRONS AMBIGUA, sub-sp. nov.

Similar to *S. r. rufifrons*, Hume, from Pegu, differs in having the lores yellow instead of white; in having the feathers of the forehead conspicuously black shafted; chin, whitish and not contrasting with the remainder of the lower plumage; breast and under parts, pale fulvous and not a rich tawny buff.

Bill, light fleshy; irides, light brown; legs, fleshy. Wing: males, 53-54 mm., females, 51-52 mm.

Type in the Tring Museum. Coll. E. C. S. Baker, Gunjong, N. Cachar, 26th Dec. 1895.

Distribution.—Probably Sikhim, Butan Duars, Assam, Naga Hills and Manipur. Birds from Margherita, N. Assam, appear to be slightly smaller than N. Cachar specimens.

Stachyrhidopsis poliogaster, Hume, 1880.

Stachyrhis poliogaster, Hume, S. F., ix., p. 116 (1880).

Stachyrhidopsis poliogaster, Sharp Cat., B. M., vii., p. 599.

Stachyrhis poliogaster, Oates, F. B. I., i., p. 161.

Habitat.—"Gunong Pulai, near southern-west extremity of the Malay Peninsula."

There is only one specimen known, the type, which is labelled "*Cyanoderma poliogaster*." To me this appears to be a young bird of the *S. rufifrons*, Hume type, and may possibly be that species, of which there are very few good specimens.

MIXORNIS, Hodgson (1842).*

Oates, F. B. I., i., p. 166.

"The genus *Mixornis* differs from all the other genera of slender-billed *Timeliinæ* in having the nostrils oval, exposed and not covered by a scale or membrane as in the others." (Oates).

They have besides the following characteristics, a short rounded wing, the first four primaries graduated; wing and tail about equal in length; the feathers of the forehead soft; bill slender and slightly curved; rictal bristles weak; and no overhanging hairs over the nostrils.

There is an extraordinary resemblance in the coloration of *Mixornis* and *Stachyridopsis ruficeps*, both having rufous caps; yellowish under parts, and striped throats, and have consequently been often confused. The distinguishing feature between these two genera being their bills, in *Mixornis* this is slender and slightly curved, and the nostrils exposed, while in *Stachyridopsis*, the bill is conical, the upper and lower edges of the mandibles straight, and almost the same description as in the Goldfinch, and the nostrils covered by a membrane.

Mixornis extend from the foot-hills of Nepal to Assam and Burma, and from there into Malayana and the Islands; within Indian limits we have two geographical races which gradually pass from one into the other.

MIXORNIS GULARIS RUBRICAPILLUS, Tickell.

Motacilla rubricapilla, Tickell, J. A. S. B., ii., p. 576 (1833).

Mixornis rubricapillus, Sharpe, Cat., B. M., vii., p. 578; Oates, F. B. I., i., p. 167.

Stachyridopsis sulphurea, Rippon, Bull., B. O. C., xi., p. 11.

Mixornis gularis rubricapillus, Harington, Bull., B. O. C., xxxiii.

"Female 5 inches, eyes reddish hazel; bill and legs pale horn; crown of head rusty; feathers of the nostrils, over the eye, auriculars and sides of the neck, pale yellowish green; upper parts olive; throat and breast pale yellow shafted black." (Tickell).

Description.—"Extreme point of forehead and the lores yellow with black shafts, continued back as a uniform yellow supercilium; crown pale ferruginous, blending on the nape with the olive-green of the upper plumage and sides of the neck; ear-coverts dull yellow with pale shafts; centre of breast and abdomen plain yellow; remainder of lower plumage dull ashy yellow." The upper plumage wings and tail have a decided rufous tinge.

Birds from Sikhim, Bengal and the Butan Duars have very little rufous on the head, which is almost uniformly the same as the back, with only a slight rufous wash on the forepart of the head; under parts very dull.

Birds from Assam are a little more rufous on the head, but under parts dull yellow. "Iris reddish hazel; bill horny; legs pale horny."

Birds from Burma have the forehead and crown bright rufous; and under parts bright yellow. "Iris a sickly white."

Wing 57-61 mm.; tail 54 mm.; culmen 13-14 mm.; tarsus 20 mm.

Distribution.—Chota Nagpore, Sikhim to Assam, throughout Burma and the Shan States to Tenasserim, it does not ascent the hills to any great height. (Lately recorded from Bengal in Journal).

Habits and Nesting.—In Burma, I have found it very partial to bamboo jungle, and essentially a plains bird, not ascending the hills to any great

*Outside Indian limits, there are numerous races of this genus, which extends as far as the Philippine Islands.

M. flavicollis, Bp., Java; *M. frigida*, (Hartl.), W. Sumatra; *M. prillwitzii*, Hartert, Kangean Islands; *M. everetti*, Hartert, Natuna Islands, *M. woodi*, Sharpe, Philippine Islands; *M. javanica*, Cab., Java; *M. montana*, Sharpe, N. W. Borneo; *M. erythronota*, Reichenow, Java.

height. Although nesting near the ground, it seems to have lost its Timeliine habits, and appears to feed entirely in trees. It has a very monotonous call of "Chuk, Chuk, Chuk," which it seems to utter throughout the day. The breeding season commences in March, the nest, an untidy dome shaped affair of bamboo leaves and grass, is either placed in the bamboo clump, or small bush near the ground. 2, 3, and 4 eggs are incubated, these are white spotted with rusty red chiefly at the larger end.

Note.—*Stachyridopsis sulphurea*, Rippon, Bull., B. O. C., xi., p. 11 (1900). "The specimen so named by Col. Rippon is not a *Stachyridopsis*, but an example of *Mixornis gularis rubricapillus*, Tickell. The name therefore becomes a synonym of that species." (Harington.)

MIXORNIS GULARIS' GULARIS, Raffles.

Motacilla gularis, Raffles, Trans. Linn. Soc., xiii., p. 312 (1820).

Mixornis gularis, Sharpe, Cat., B. M., vii., p. 576; Oates, F. B. I., i., p. 168.

Description.—Similar to *M. rubricapillus*, differs in having a more brownish tinge on the back; chin, throat and breast boldly striped with black; crown dark chestnut; wings also a dark chestnut.

Iris, pale red-brown; lower mandible and orbital skin, pale blue; rest of bill bluish-brown; legs and feet greenish-brown.

Wing 58-62 mm.; bill 14-16 mm.; tail 57 mm.; tarsus 20 mm.

Distribution.—S. Tenasserim to the Malay Peninsula and Sumatra.

CYANODERMA, Salvadori (1874).

Very similar in characteristics to *Stachyrhis*, differs from that genera in having the skin round the eye naked, and of a bright colour, only one species just comes within Indian limits.

Distribution.—*C. erythropterum*, Blyth, S. Tenasserim to Sumatra and Borneo; *C. fulvirenter*, Richmond, Banjak Island, N. W. Sumatra; *C. bicolor*, Blyth, Borneo, Labuan.

CYANODERMA ERYTHROPTERUM, Blyth.

The Red-winged Babbler.

Timalia erythropterum, Blyth, J. A. S. B., xi., p. 794 (1842).

Mixornis erythropterum, Sharpe, Cat., B. M., vii., p. 580.

Cyanoderma erythropterum, Oates, F. B. I., i., p. 166.

Description.—As in Oates, F. B. I.

Distribution.—As above. I can find nothing recorded as to the nesting habits of this genus.

TURDINULUS Group.

In this, I have placed *Corythocincl*a, *Turdinulus* and *Rimator*, all of which are remarkable for their extremely short tails.

They all have the following characteristics: a short rounded wing, and an extremely short tail; and upper plumage more or less squamated.

KEY.

- | | | | | |
|----|----------------------------|----|----|---------------------|
| A. | Bill long and curved | .. | .. | <i>Rimator</i> . |
| B. | Bill moderate and straight | .. | .. | <i>Turdinulus</i> . |

TURDINULUS, Hume (1878).

Turdinulus, Hume, (1878); Oates, F. B. I., i., p. 176.

Corythocichla, Sharpe, (1883); Oates, F. B. I., i., p. 148; O.-Grant, Ibis, 1897, p. 58; Hartert, Nov., Zool., ix., p. 564; Buttikofer, Notes, Leyden Museum, xvii., p. 74.

"Small; bill slender, compressed on the anterior half, nostrils covered by a membrane, nasal aperture split-shaped, and placed along the

bottom near the front of the membrane; tarsi and toes long, the first more than half the tail, which is very short, giving, together with the rounded wing, the bird a very ball-like appearance, much reminding of *Troglodytes*; rictal bristles short; plumage mottled above and below, the feathers of the back with white or pale fulvous shaft-streaks; rump-plumes unstriped, very long and fluffy; superciliary streak and triangular spots on the tips of the wing-coverts and inner secondaries white or pale fulvous." (Buttikofer).

Both Mr. Ogilvie-Grant and Dr. Hartert agree in uniting *Turdinulus* and *Corythocichla* in the same genus; they have the same characteristics, except in the former the tail is extremely short, the exposed portion of the tail extending barely half an inch beyond the tail coverts, while in the latter they extend about an inch.

Their wings are short and rounded, fitting close to the body, the first four primaries graduated; tail much shorter than the wing; upper plumage squamated; bill straight; rictal bristles weak; no hairs overhanging the nostrils; nostrils slits, with no actual overhanging membrane.

AMENDED KEY TO THE SPECIES OF TURDINULUS.

(Cf. *Ogilvie-Grant, Ibis* 1896), p. 58.,

Harington, Bull. (B. O. C., xxiii., p. 45.)

- I. Tail extending more than 1 inch beyond the upper tail-coverts. (*Corythocichla*.)
 - A. Feathers of the middle of the throat white or grey, each with a median greyish-black streak.
 - a. Tips of the wing-feathers white.
 - a'. Sides of the breast and flanks chestnut.
 - a". Wings 65 mm. and under *T. brevicaudatus*
brevicaudatus.
 - b". Wing over 65 mm. *T. b. venningi.*
 - b'. Sides of the breast and flanks reddish-olive-brown *T. b. leucostictus.*
 - b. Tips of the wing-feathers buff; sides of the breast and flanks reddish-brown *T. b. striatus.*
- II. Tail extending less than half an inch beyond the upper tail-coverts. (*Turdinulus*.)
 - B. Feathers of the middle of the throat white or whitish-buff, with a triangular black spot at the end of each. Tips of wing-feathers white.
 - c. General colour of plumage brown, washed with rufous, especially on the sides of the breast and flanks *T. roberti roberti.*
 - d. General colour of plumage dark brown; sides of the breast and flanks dark olive-brown *T. r. guttaticollis.*
 - C. Feathers of the middle of the throat uniform, devoid of black streaks or spots.
 - e. Middle of throat white.
 - c'. Sides of the neck spotted with black and white; breast reddish-brown boldly striped with white *T. epilepidotus*
epilepidotus.
 - d'. Sides of the neck spotted with black and buff; breast buff, margined with reddish-brownish, producing a squamate appearance *T. e. exsul.*

- e'*. Sides of the neck spotted with brown and buff; breast with brownish-buff edges *T. e. granti*.
f. Middle of throat buff.
f'. General colour of plumage brown, washed with rufous, especially on the sides of the breast and flanks *T. e. davisoni*.
g'. General colour of plumage dark brown, sides of the breast and flanks dark olive-brown *T. e. bakeri*.

Geographical Distribution.

(*Corythocichla*).—(1) *T. b. brevipaudatus* (Blyth), Tenasserim; (2) *T. b. venningi*, Harington, Shan States and Yunnan; (3) *T. b. leucostictus* (Sharpe), Perak, Malay Peninsula; (4) *T. b. striatus* Walden, Assam and Manipur, (*Turdinulus*).—(5) *T. r. roberti* G. Austen, Khasia, Garo Hills, N. Cachar, Lushai Hills, Manipur, and Naga Hills; (6) *T. r. guttaticollis* O.-Grant, Mishmi and Miri Hills, Dibrugarh, Assam; (7) *T. epilepidotus epilepidotus*, Temm, Java and Sumatra; (8) *T. e. exsul* Sharpe, Borneo; (9) *T. e. granti*, Richmond, Siam and Malay Peninsula; (10) *T. e. davisoni* O.-Grant, Tenasserim; (11) *T. e. bakeri* Harington, Shan States, Burma.

TURDINULUS BREVICAUDATUS BREVICAUDATUS, Blyth.

Blyth's Wren-Babbler.

Turdinus brevipaudatus, Blyth, J. A. S. B., xxiv., p. 272 (1855).

Corythocichla brevipaudata, Sharpe, Cat., B. M., vii., p. 592; Oates, F. of B. I., i., p. 148.

Description.—"Whole upper plumage and sides of the neck olive-brown; the feathers everywhere margined with black except on the rump and upper-tail coverts; tail rufescent; wings olive brown; the coverts and all the quills, except the earlier primaries, tipped with a small white spot; lores, a short supercilium, cheeks and under the eye deep ashy; ear coverts the same; but tinged with rufescent; chin and throat ashy white, streaked with dark brown; breast and lower plumage ferruginous, paler on the centre of the abdomen, darker on the flanks, vent, and under-tail coverts, which latter are tipped paler." (Oates.)

"Legs, feet, and claws, pale-brown to pale fleshy brown; upper mandible very dark brown, lower plumbeous to pale plumbeous; iris, deep brown, red-brown, cinnamon-red." (Oates.)

"Length about 5·5"; tail 1·7"; wing 2·4"; tarsus 1"; bill from gape 8". "

Distribution.—Muleyit Mt. and the hills of Tenasserim. Nothing much seems to be known about its habits, except that it inhabits the rocky portions of the hills, and seldom flies if it can help. Nothing appears to be known about its nidification, which is probably similar to that of *T. b. striata*.

TURDINULUS BREVICAUDATUS VENNINGI, * Harington.

Venning's Wren-Babbler.

Harington.—Bull., B. O. C., xxxiii., p. 44 (1913).

* TURDINULUS BREVICAUDATUS LEUCOSTICTUS, Sharpe.

Sharpe, P. Z. S., 887, p. 438.

Similar to *T. b. brevipaudatus*, differs in having no tinge of rufous below, but ashy-grey, also the same above, feathers tinged with grey with darker edges, wing spots white.

Wing 63 mm.

Habitat.—Perak, Malay Peninsula.

"Frequents the undergrowth usually in pairs, and has an unusually loud song for such a small bird." (Sharpe.)

Description Adult.—Similar to *Turdinulus brevicaudatus*, Blyth, from Tenasserim; but differs in being much larger and in having the upper plumage greyer, the breast dark rufous, the abdomen the same colour as the breast, and the flanks dark brown.

In *T. brevicaudatus* the breast is pale rufous, the abdomen creamy-buff and the flanks tinged with olive.

Wing measurements:—

T. b. brevicaudatus. 10 examples. Wing 60-65 mm. Average 63 mm.

T. b. venningi. 15 examples. Wing 65-74 mm. Average 68 mm.

"Irides red, bill dark brownish-horn, paler beneath, the legs and feet fleshy-brown." (Venning.)

Habitat.—The Southern Shan States, Burma, and Yunnan.

There is one specimen collected by Colonel Rippon in the Salween Valley (presumably in Yunnan), 2,800 to 3,000 feet.

"I have the eggs of a *Turdinulus* from the Southern Shan States which are presumably of this sub-species. They are exactly like those of *T. b. striatus* hereafter described and measured 84" × 62"." E. C. S. B.

TURDINULUS BREVICAUDATUS STRIATUS, Walden.

Walden's Wren-Babbler.

Turdinus striatus, Walden, A. M. N. H. (4), vii., p. 241 (1871).

Corythocichla striata, Sharpe, Cat., B. M., vii., p. 593; Oates, F. of B. I., i., p. 148; Stuart Baker, J. B. N. H. S., viii., p. 179.

Description.—Similar to *T. brevicaudatus*, "Differs in having the sides of the head brown instead of deep ashy, and in having the breast and lower plumage brown slightly tinged with rufous, instead of ferruginous; the spots at the tips of the wing-coverts and quills are less distinct, and are fulvous, and not white."

Length about 5"; tail 1.8"; wing 2.3"; tarsus 95"; bill from gape 8". (Oates.)

Distribution.—The Khasia, Cachar and Garo Hills, Manipur and Dibrugarh in Assam, both N. and S. of the Brahmapootra.

Habits.—Stuart Baker gives a very good description of the habits and nidification of this bird in the Journal. Shortly these are, it rarely makes use of its wings, but moves about quickly on its feet, it builds an almost domed nest of leaves and moss, lined with the same, which is invariably placed on the ground. The eggs, of which four appears to be the full complement, are white, freckled with pinkish red spots, with underlying pinkish purple markings; and measure from .78" to .83" by .59" to .62'.

TURDINULUS ROBERTI ROBERTI, Godwin-Austen.

Austen's Wren-Babbler.

Pnoepyga roberti, Godwin-Austen and Walden, Ibis (1875), p. 252.

Turdinulus roberti, O. Grant, Ibis (1896), p. 55; Blanford, F. B. I. iv., App. P., p. 480.

Corythocichla squamata, S. Baker, J. B. N. H. S., xiii., p. 403.

Description.—Upper plumage brown with a rufous tinge, each feather pale centred with darker edges, giving a mottled appearance; supercilium buffish-white; feathers of the middle of the throat white, with a triangular black spot at the end of each feather; sides of the throat ferruginous; breast olive-brown with broad white shaft stripes, giving a very striped appearance; flanks olive-brown tinged with rufous; vent and under-tail coverts bright rufous; wing coverts and wing feathers tipped with white.

Wing measurement, 55 mm.

Distribution.—The Cachar, Manipur and Naga Hills.

Habits.—"Robert's Babbler is to be found in some numbers, though nowhere, I imagine, commonly, in the higher ranges bordering on the plains of Assam. The nest and eggs are exact counterparts of those of *Corythocichla striata* in everything but size. Three seems to be the ordinary number of eggs laid, though sometimes as many as four are found, and about equally often only two are found." "My eggs average .71" by .56" and vary in length between .80" and .67" and in breadth between .53" and .58". (Baker, Ibis (1906), p. 106)."

TURDINULUS ROBERTI GUTTATICOLLIS, * O. Grant.

Grant's Wren-Babbler.

T. guttaticollis, O.-Grant, Ibis. (1895), p. 432, *ibid* (1896), p. 57.

Description.—Very similar to *T. r. roberti*. differs in being darker and browner above; and lacks the rufous on the sides of the breast and flanks; also there is very little rufous on the cheeks.

Wing measurement; 55 mm.

Distribution.—The Hill Ranges N. and S. of the Brahmapootra in eastern Assam. There are two specimens in the Museum collected by Dr. Coltart from Margherita, Assam, which are undoubtedly this sub-species.

Habits.—"The habits and nidification are exactly like those of *T. roberti*. The bird is a skulker, creeping about the undergrowth and bushes much like a wren and never taking to wing unless forced. It is found singly or in pairs and never in flocks like other Timeliinæ, in fact in every way it is very wren like habits, nidification, flight and general appearance. E. C. S. B."

* TURDINULUS EPILEPIDOTUS DAVISONI, O. Grant.

Davison's Wren-Babbler.

O. Grant, Bull., B. O. C., xxv., p. 97.

"Easily distinguished from *T. e. exsul* (Sharpe), to which it is most nearly allied, by having the cheeks and side of the throat washed with rust colour, (note, as in *roberti*), and under parts more olive-brown, much less suffused with rufous, and distinctly streaked with whitish."

Measurements as in *exsul*.

Distribution.—Tenasserim.

* TURDINULUS EPILEPIDOTUS EPILEPIDOTUS, Temm.

Description.—Similar to *T. r. roberti*, throat unspotted white, cheeks white spotted with black breast olive-brown, with white shaft-stripes giving a very streaked appearance

Distribution.—Java and Sumatra.

TURDINULUS EPILEPIDOTUS HAINANUS, Hartert.

Hartert, Nov. Zool., xvii, p. 230 (1910).

Like *Turdinulus, r. roberti*.

Habitat—The Island of Hainan.

TURDINULUS EPILEPIDOTUS EXSUL, Sharpe (1888).

. *exsul*, Sharpe, Ibis (1888), p. 479.

Habitat.—Borneo.

TURDINULUS EPILEPIDOTUS GRANTI, Richmond (1900).

Turdinulus granti, Richmond, Proc. U. S. Nat. Mus., p. 320 (1900); *Thumii* (Hartert), Nov. Zool., ix., p. 564; Grant, Bull., B. O. C., xxv., p. 97.

Similar to *T. e. exsul* (Sharp), Borneo. Throat unspotted white, under parts very much paler, the feathers of the centre of the breast having white centres giving a very pale appearance below. Wing, .55 mm.

Distribution.—Siam and Malay Peninsula.

TURDINULUS EPILEPIDOTUS BAKERI, Harington.

Baker's Wren-Babbler.

Harington, Bull., B. O. C., xxxiii., p. (1913).

Adult. Similar to *T. e. davisoni* (O. Grant) from Tenasserim ; but differs in having the under parts not suffused with rufous, and in having the upper plumage much darker. The differences are very similar to those between *T. roberti* ; (Godwin-Austen), from the Naga and Manipur Hills and Cachar, and *Turdinulus roberti guttaticollis*, O. Grant, from the Miri and Mismi Hills, and the Dibrugarh District of Assam.

Measurements, the same as *T. e. davisoni*.

Habitat.—The Southern Shan States and Karennee, Burma.

Type.—In the British Museum.

RIMATOR, Blyth (1847).

Oates, F. B. I., i., p. 175.

“ In this genus the bill is slender and as long as the head ; the culmen is curved downwards and the tip of the bill is barely notched ; the rictal bristles are short ; the nostrils are open ovals. The tail is less than half the length of the wing and slightly rounded.” (Oates.)

RIMATOR MALACOPTILUS, Blyth.

The Long-billed Wren-Babbler.

Blyth, J., A. S. B., xvi., p. 155 (1847) ; Sharpe, Cat., B. M., vii., p. 594 ; Oates, F. B. I., i., p. 175 ; Baker, Ibis, 1909 p. 104.

Description.—As in Oates, F. B. I.

Distribution.—Sikhim, Manipur and Cachar Hills.

Nidification.—It appears to build an untidy domed nest on the ground, laying four eggs. The ground colour a faint pinkish-white, the markings rather profuse at the large end, consisting of specks and blotches of reddish brown, measuring from $\cdot 84''\text{--}\cdot 81'' \times \cdot 60''\text{--}\cdot 62''$.

SETARIA Group.

These are birds I know personally nothing about, only having examined and gone through the specimens in the British Museum. *Setaria* and *Æthostoma* appear to me to be non-Timeline in every way ; on the other hand *Erythrocinchla* seems to have a relationship to *Malacocinchla* (*Tardinus*). I can find nothing recorded about the nidification of these genera, there are, however, two eggs of *Malacopteron* (*Ophrydornis*) *albigularis*, in the Museum, these are a pale spotless blue and thoroughly non-Timeline.

These three genera have the following characteristics : stout straight bills ; extremely long rictal bristles ; long pointed wings ; a short tail and weak legs and feet.

SETARIA, Blyth (1844).

Sharpe, Bull., B. O. C., xii., p. 54. Sharpe, Hand List of Birds, iv., p. 38.

Malacopteron, Oates, F. B. I., i., p. 150.

Dr. Sharpe gives the above generic name for *Malacopteron*, Eyton, which is already occupied.

“ This genus is remarkable for its lengthened wings and, in consequence, its comparatively short tail. The plumage is soft and silky. The two Indian species of this genus appear to be more arboreal in their habits than any of the preceding genera, and to have somewhat of the deportments of Bulbuls. The rictal bristles are very conspicuous on account of their length.” (Oates.)

Büttikofer.—Notes—Leyden Museum, xvii., p. 101.

“Bill long and rather stout, not fully as long as the head, as high at the nostrils as it is broad; nasal aperture oval and placed in front of the nasal groove; rictal bristles long, reaching beyond the nostrils; tail considerably shorter *than the pointed wing*, but three times as long as the tarsus, *which is remarkably short*, not more than an inch in length; toes rather short and weak in proportion to the tarsus.”

The chief characteristics of this genus are given by Dr. Büttikofer, namely: a pointed wing, and remarkably short tarsus and weak feet. These characters are total foreign to the *Timeliinæ*, whose characteristics are a short rounded wing, and large and strong legs and feet. Besides the above, *Setaria* have powerful straight bills, with a few overhanging hairs over the nostrils and long well developed rictal bristles.

SETARIA MAGNA MAGNA,* Eyton

The Red-headed Tree-Babbler.

Malacopteron magnum, Eyton, P. Z. S. (1839), p. 103; Sharpe, Cat., B. M., vii., p. 565; Oates, F. B. I., i., p. 151.

Description.—“Forehead and crown bright ferruginous, the anterior feathers black-shafted and the posterior ones faintly edged with black; lores and a broad supercilium grey; the middle of the feathers whitish; the whole nape black; ear-coverts fulvous-brown with pale shafts; the whole upper plumage olive-brown, tinged with ferruginous on the rump, which colour also suffuses the upper tail-coverts and the outer webs of the tail feathers; cheeks mottled grey and white; chin, throat, and upper breast white, streaked with grey; remainder of lower plumage greyish-white.”

“Legs, feet, and claws, blue, varying from pale plumbeous to pale small blue; upper mandible dark horny brown, lower mandible and often the edges of the upper plumbeous blue, fading to bluish white at the tips; iris carmine to orange red.”

Length about 7", tail 3", wing 3·5", tarsus 9", bill from gape 1".

Distribution.—The extreme south of Tenasserim, extending down the Malay Peninsula to Sumatra and Borneo.

Habits and Nesting.—I can find nothing recorded about its nidification. “This bird hunts about trees and bushes in pairs and small parties, seldom or never descending to the ground.” (Oates.)

SETARIA MAGNIROSTRIS, † Moore.

The Brown-headed Tree-Babbler.

Setaria magnirostre, Oates, F. B. I., vol. i., p. 151.

Turdinus magnirostris.—Sharpe, Cat., B. M., vol. vii., 547.

Description.—As in Oates, F. B. I.

Distribution.—The extreme south of Tenasserim, the Malay Peninsula, and Cochin China.

* SETARIA MAGNA CINEREA, Eyton.

Malacopteron cinereum, Sharpe, Cat. B.M., p. 565.

Bill black, the mandible whitish lead colour; legs and feet pale pinkish lead-grey; iris, Indian red. Length 6", culmen 65, wing 3, tail 25, tarsus 8. Female slightly smaller.

Distribution.—Malay Peninsula, Borneo, Sumatra.

† SETARIA AFFINIS, Blyth.

Malacopteron affine, Sharpe, Cat., B. M., vii., p. 569.

Lores and a short streak to the eye whitish; forehead, crown and nape dark brownish to black, upper plumage dark fulvous brown, tinged ashy on upper

AETHOSTOMA, Sharpe (1902).

Sharpe, Bull., B. O. C., xii., p. 54 (1902).

Trichostoma, Blyth.

Oates, F. B. I., i., p. 153.

Dr. Sharpe proposes the above name for this genus, *Trichostoma*, being already occupied.

This genus is very nearly allied to *Setaria*, and is not a true *Timeliidae*, having a fairly long wing, which does not fit close to the body, and is not probably strictly arboreal, and for these reasons should be removed from this group. It has the following characteristics: Wing long, the first four primaries graduated; tail shorter than the wing; tarsus not particularly long; bill short and straight; rictal bristles very long.

back and rufous on rump; upper tail-coverts chestnut; feathers of lower back dense and long, concealing a few whitish feathers just above the tail coverts; exposed portions of wing like back, tail dark-brown, outer edges tinged chestnut; chin and throat white faintly streaked with grey, sides of the neck and ear coverts ashy, breast whitish washed with brownish-grey, abdomen and under-tail coverts whitish; flanks brownish-grey. "Legs dark or bluish lead-colour: iris bright brown or dark raw sienna: bill bluish lead-colour, the culmen darker." (Sharpe.)

Length 6·2", culmen ·65", wing 2·8", tail 2·8", tarsus ·85". (Sharpe).

Distribution.—Malay Peninsula, Sumatra, Borneo.

†OPHRYDORNIS ALBIGULARIS, Blyth.

Malacopteryx albigularis, Sharpe, Cat. B. M., vii., p. 568.

Setaria albigularis, Oates, Cat., Birds Eggs, iv., p. 38.

Ophrydornis albigularis, Büttikofer Notes, Leyden Museum, xvii., p. 101.

Lores and a conspicuous streak over the eyes white, forehead, crown and nape dark sooty brown to dull black; upper plumage dark umber brown, tinged with ashy on the upper back and rufous on rump and upper-tail coverts; exposed portions of tail and wing, same as middle of the back, a dark umber brown; ear-coverts like the crown; chin and throat white, a pale ashy-grey collar from the sides of the neck across the breast, abdomen whitish tinged with greyish-buff on the flanks; and under-tail coverts pale fulvous.

"Bill black; legs leaden grey; iris bright red or crimson. Length 5·6", culmen ·6", wing 2·95", tail 2·2", tarsus ·8".

Distribution.—Malay Peninsula, Borneo.

The two eggs of the Malayan White Throated Babbler, in the collection are of a blunt oval form, glossy, and of a spotless pale greenish-blue. They measure, respectively, ·75" × ·53" and ·75" × ·52", Klang, Malay Peninsula, W. Davison (Hume, Coll.). I cannot find any account of the nesting of this species, the eggs are however, of a quite un-*Timeline* character.

†OPHRYDORNIS MELANOCEPHALA, Davison.

Malacopteryx melanocephalum, Davison, Ibis (1892), p. 101.

Similar to *O. albigularis*.

"Lores dirty white; forehead, top of head and nape, dull black, cheeks and ear-coverts grey, ear coverts pale shafted; Back, rump and upper tail-coverts olive-brown, suffused most strongly so on upper tail coverts with rusty: tail feathers brown like the upper back, margined with a rusty tinge on the outer webs, none of the tail feathers with any trace of white or pale tipping. Lower surface white, the feathers of the breast suffused with grey, forming a feather band, with grey continuing down the flanks."

Only one female secured.

Length 6·45, wing 3·0, tail 3·1, tarsus 9, bill from nape 8·2.

Habitat.—Mouth of Timeling river. Pahang, E. Malay Peninsula.

Note.—Have not been able to examine this species.

AETHOSTOMA ROSTRATUM, Blyth.

Blyth's Babbler.

Trichostoma rostratum, Blyth, T. A. S. B., xi., p. 795 (1842); Sharpe, Cat., B. M., vii., p. 562; Oates, F. B. I., i., p. 153.

Description.—As in Oates, F. B. I.

Nothing appears to be known about the habits of this bird.

Distribution.—Extreme south of Tenasserim, extending to Sumatra and Borneo.

ERYTHROCICHLA, Sharpe (1883).

Buttikofer. Notes Leyden Museum, xvii., p. 98.

Bill long and strong, rather broad at the base, nasal aperture linear; rictal bristles long and rigid, reaching beyond the nostrils; tail much shorter than the wing.

I may be wrong in placing *Erythrocichla* in this group, as it appears to be more a ground bird and has a distinct likeness to *Malacocichla abbotti*.

ERYTHROCICHLA BICOLOR, Less.

The Ferruginous Babbler.

Brachypteryx bicolor, Less., Rev. Zool. (1839), p. 138.

Erythrocichla bicolor, Sharpe, Cat. B. M., vii., p. 551; Oates, F. B. I., i., p. 152.

Description.—As in Oates, F. B. I.

Distribution.—Extreme south of Tenasserim, extending down the Malay Peninsula to Sumatra and Borneo.

Family.—Sibiidæ.

Sexes similar; nostrils exposed; habits strictly arboreal; size medium (*Yuhina* Group small); wing moderately long; legs and feet not particularly strong.

Mr. Oates in the Fauna of India includes in his Sibiinæ a large number of genera which have nothing much in common with each other. I have divided up the family into two sub-families, *Sibiinæ* and *Yuhinæ*.

Sibiinæ.

I think this should only contain, *Sibia*, *Lioptila*, and possibly *Actinodura* and *Ixops*, these last two show a marked affinity to the *Trochalopteron* in the colour of their eggs.

Yuhinæ.

I have placed the following genera together, *Yuhina*, *Ixulus*, *Staphidia*, and *Herpornis*, they appear to form a connecting link between the *Alcippe* and the *Lioptila*. They, however, differ greatly from the latter in size and appearance, as well as in nidification.

SIBIINÆ.

Have the following characteristics: wing, long and not rounded, the first four primaries graduated, the fifth and sixth equal and longest; tail long (short in *Ixops*) and graduated; legs and feet moderate; bill narrow and slightly curved; habits purely arboreal; eggs various in colouration.

The true *Sibiinæ* are strictly arboreal in habits, many going about in large family parties, and during the breeding season are extremely noisy.

They all appear to build their nests at a considerable height from the ground. Whilst the "bar-wings" (*Actinodura*) build nests of a Laughing-Thrush type at no great distance from the ground.

SIBIA, Hodgson, (1836).

Oates, F. B. I., i., p. 195.

"The genus *Sibia* contains but one species, which is remarkable for the extraordinary length of its tail. This is twice the length of its wing, and greatly graduated."

"The bill is shorter than the head, curved down and slender and the nostrils covered by a large membrane. The rictal bristles are moderate in length." (Oates).

SIBIA PICAOIDES PICAOIDES,* Hodgson.

The Long-tailed Sibia.

Hodgson, J. A. S. B., viii., p. 38 (1839); Sharpe, Cat., B. M., vii., 201; Oates, F. B. I., i., p. 195.

Description.—As in Oates, F. B. I.

Distribution.—Nepal, Sikkim, Bhutan, Assam, Manipur, Chin Hills, Myitkyina Dist., Shan States and Tenasserim, Burma.

LIOPTILA, Blyth (1847).

Oates, F. B. I., i., p. 195.

"*Lioptila* only differs from *Sibia* in the length of its tail; in the shape of bill, nostrils and wing, they are similar to that genus.

KEY, as in Oates, F. B. I.

Our knowledge of the nidification of this genus is still very incomplete, some appear to lay eggs of a very Thrush-like (Meruline) type, whilst others are recorded as laying pale spotless blue eggs.

LIOPTILLA CAPISTRATA CAPISTRATA, Vigors.

The Black-headed Sibia.

Cinclosoma capistratum (Vigors), P. Z. S. (1831), p. 56.

Sibia capistrata (Sharpe), Cat., B. M., vii., p. 403.

Lioptila capistrata (Oates), F. B. I., i., p. 196.

Description.—As in Oates, F. B. I.

Distribution.—The Himalayas from about Naini Tal to Sukhim and Bhutan.

LIOPTILLA CAPISTRATA PALLIDA, Hartert.

The Pale Sibia.

Hartert, Kat. Vog. Senekenb Mus., p. 21 (1891); Blanford, F. B. I., App. Vol. iv., p. 481.

Description.—Similar to *L. capistrata*. Differs in being very much paler, both above and below; the breast being almost pinkish instead of bright rufous.

*SIBIA PICAOIDES SIMILLIMA. Salvadori.

Salvadori., Ann. Mus. Civic. Genov., xiv., p. 232, 1879; Sharpe, Cat., B. N., vii, p. 402.

Description.—Similar to *S. p. picaoides*, Hodgson. "Differs in having flanks browner than the throat, which is slightly slaty-grey; vent and undertail tawerts dull whitish; wing spot smaller and oblong, about half the length of corsus." Sharpe.

Habitat.—Sumatra and the Malay Peninsula

Both Dr. Sharpe and Mr. Oates note the paleness of birds from the N.-W. Himalayas.

Distribution.—N.-W. Himalayas from Hazara to about Simla.

LIOPTILA GRACILIS, McClell.

The Grey Sibia.

Hypispetes gracilis, McClell, P. Z. S. (1839), p. 159.

Malacias gracilis, Sharpe, Cat., B. M., vii., p. 100.

Lioptila gracilis, Oates, F. B. I., i., p. 197.

Description.—As in Oates, F. B. I.

Distribution.—The Khasia and Naga Hills, Manipur and Chin Hills, Burma.

LIOPTILA MELANOLEUCA MELANOLEUCA, Tickell.

Tickell's Sibia.

Sibia melanoleuca, Tickell, Blyth, J., A. S. B., xxviii, p. 413 (1859.)

Malacias melanoleuca, Sharpe, Cat., B. M., vii., p. 405.

Lioptila melanoleuca, Oates, F. B. I., i., p. 198; Bingham, J., A. S. B., lxix., Part ii. (1900); Rippon, Ibis (1901), p. 533.

Description.—As in Oates, F. B. I.

Distribution.—Muleyit Mt. in Tenasserim, it then re-appears in the Shan States, being found along the central range up to Loi-San-Pa, and from here it again appears in the Ruby Mines District. Birds from this last locality seem to me to be much darker than those from Tenasserim, and are very like *L. m. castanoptera*, with the exception of the wing-coverts, which are chestnut in that species.

LIOPTILA MELANOLEUCA CASTANOPTERA, Salvadori.

Fea's Sibia.

Malacias castanoptera, Salvadori, Ann. Mus. Civ. Gen. (2), vii., p. 363 (1889).

Lioptila castanoptera, Oates, F. B. I., i., p. 199.

Description as in Oates, F. B. I.

Distribution.—Karennee and the western ranges of the Shan States up to Kalaw. It must meet the last species *L. melanoleuca*, in some parts of their distribution, and the two species inter-breed, as there is a specimen in the British Museum of *L. melanoleuca* which shows traces of chestnut on its wings.

LIOPTILA ANNECTENS ANNECTENS, Blyth.

Blyth's Sibia.

Blyth, J. A. S. B., xvi., p. 450 (1847); Sharpe, Cat., B. M., vii., p. 80; Oates, F. B. I., i., p. 199.

Description.—As in Oates, F. B. I.

Distribution.—Sikhim, Khasia, Naga and Chin Hills and Manipur.

LIOPTILA ANNECTENS SATURATA, Walden.

Walden's Sibia.

Walden, Ibis, 1875, p. 352; Oates, F. B. I., i., p. 199.

Description.—Similar to *L. annectens*, differs in having the back a rich deep chestnut.

Distribution.—The eastern hills of Burma, Bhamo Hills, Shan States and Karennee.

LIOPTILA ANNECTENS DAVISONI, * Hume.

Davison's Sibia.

Hume, St. Frs., v., p. 110 (1877); Sharpe, Cat., B. M., vii., p. 80; Oates, F. B. I., i., p. 200.

Description.—“Like *L. a annectens*, Blyth, but with the back and wing coverts black; and the rump and upper tail coverts mingled black and deep ferruginous maroon.” (Hume).

Distribution.—Muleyit, Mt. Tenasserim.

LIOPILO PULCHELLA, †Godwin-Austen (1874).

The Beautiful Sibia.

Sibia pulchella, Godwin-Austen, A. M. N. H. (4), xiii., p. 160 (1874).

Malucias pulchella, Sharpe, Cat., B. M., vii., p. 407.

Lioptila pulchella, Oates, F. B. I., i., p. 200.

Description.—As in Oates, F. B. I.

Distribution.—The Naga and Daphla Hills, Assam.

Sub-family.—ACTINODURINÆ.

Have the following characteristics: wing rounded and fitting close to the body, the first four primaries graduated, and the wings conspicuously barred black and chestnut; the tail greatly graduated; the bill stout and gently curved; no hairs overhanging the nostrils which are covered by a membrane; numerous long hairs on the chin and throat.

This sub-family consists of two genera, which only differ in the length of their tail.

a. Tail considerably longer than the wing... *Actinodura*.

b. Tail slightly shorter than the wing... *Ixops*.

ACTINODURA, Gould (1836).

Oates, F. B. I., i., p. 201.

“In *Actinodura* the bill is rather slender, about half the length of the head; the nostrils are covered by a very large membrane, and the rectal bristles are long and distinct. The tail is considerably longer than the wing and greatly graduated.” (Oates).

KEY.

a. No white ring round the eye. *A. egertoni* and sub-species.

b. A conspicuous ring of white feathers round the eye.

a.¹. Crown the same colour as the back. *A. r. ramsayi*.

b.¹. Crown tinged with rufous. *A. r. radcliffei*.

Distribution.—*A. egertoni egertoni*, Gould, Nepal, Sikhim, Daphla Hills, Shengorh Peak; *A. e. khasina*, Godwin-Austen, Khasia, Naga, and Manipur Hills; *A. e. ripponi*, O.-Grant, Mt. Victoria, Chin Hills, and the Bhamo Hills; *A. ramsayi ramsayi*, Walden, Southern Shan States and Karennee; *A. r. radcliffei*, Harington, the Ruby Mines District, Burma; *A. souliei*, Oustalet, W. China and Yunnan.

* LIOPTILA DESGODINSI, Oustalet.

Oust. and David. Bull. Soc. Philom, Paris (7), i., p. 139, 1877; Sharpe, Cat., B. M., vii. p. 406.

Occurs in Yunnan, where several specimens were procured by Col. Rippon

† LIOPTILA AURICULARIS, Swinhoe,

Swinhoe, Ibis, 1864, p. 361; Sharpe, Cat., B. M., vii., p. 405.

Habitat.—Formosa.

Key of *Actinodura egertoni* and sub-species.
(O. Grant, Ibis. 1907, p. 186.)

<i>A. e. egertoni</i> , Gould.	<i>A. e. khasiana</i> (G. A.)	<i>A. e. ripponi</i> , O. Grant.
<i>Forehead.</i> Dark chestnut extending on to crown.	Rufous, not extending beyond eye.	Rufous, usually not extending beyond eye.
<i>Crown.</i> Darkish-grey.	Light ash-grey.	Darkish-grey.
<i>Back.</i> Reddish olive.	Ochraceous.	Greyish olive.
<i>Middle tail feathers.</i> Dark bars, usually very faint.	Dark bars, usually distinct.	Dark bars, usually distinct.
<i>Distribution.</i> Nepal, Sikhim, Daphla Hills, Shengorh Peak.	Shillong, Naga and Khasia Hills, Manipur.	Mt. Victoria, Chin Hills, (and the Bhamo Hills.)

These three forms may be easily separated by the colour of their back.

ACTINODURA EGERTONI EGERTONI, Gould.

The Nepal Bar-wing.

Gould, P. Z. S. (1836), p. 18 ; Sharpe, Cat., B. M., vii., p. 463 ; Oates, F. B. I., i., p. 201.

Description.—As in Oates, F. B. I.

Distribution.—Nepal, Sikhim and Daphla Hills.

ACTINODURA EGERTONI KHASIANA,* Godwin-Austen.

The Shillong Bar-wing.

Godwin-Austen, J. A. S. B., xv., Part ii., p. 76 (1876) ; O. Grant, Ibis, 107, p. 186.

Description.—As in Key.

Distribution.—Shillong, Khasia and Naga Hills, Manipur.

ACTINODURA EGERTONI RIPPONI, O. Grant.

Rippon's Bar-wing.

O. Grant, Ibis, 1907, p. 186 ; Harington, J. B. N. H. S., xix., p. 118 ; Ibis (1914).

Description.—This differs from *A. egertoni*, Gould, in not having so much chestnut on the fore head ; and the back a greyish-olive instead of reddish-olive.

I procured what I considered to be this sub-species at Sinlum in the Bhamo Hills, some birds however appearing to be nearer to *A. e. khasiana*.

Nesting.—This has been described by me in the Journal, the eggs resembling those of *A. e. khasiana*, being a beautiful pale blue marked with numerous bold spots and curls of a chocolate brown.

Distribution.—Mt. Victoria, Chin Hills and the Kachin Hills, E. of Bhamo.

* *Actinodura souliei*, Oustalet.

Oustalet, Bull. Mus. Paris, (1897), p. 164.

Distribution.—W. China and Yunnan.

(I have not been able to examine this species.)

ACTINODURA RAMSAYI RAMSAYI, Walden.

Ramsay's Bar-wing.

Walden, A. M. N. H. (4), xv., p. 402 (1875) ; Sharpe, Cat., B. M., vii., p. 464 ; Oates, F. B. I., i., p. 202 ; Rippon, Ibis, 1897, p. 2, *ibid*, Ibis, (1901) p. 533.

Description.—As in Oates, F. B. I., in which, however, there is no mention of the conspicuous ring of white feathers round the eye.

Habits.—"The habits of this bird are very like those of *Lioptila castanoptera* ; it hops rapidly from branch to branch, frequently uttering its call. The call of *L. castanoptera* is three notes in the minor in a descending scale, preceded by a flourish ; that of *A. ramsayi* is the same without the flourish." (Rippon).

Nothing yet has been recorded about the nesting of this species which is fairly common in the hills to the east of Taunggyi. Col. Rippon states that it breeds in April.

Distribution.—The Southern Shan States and Karennee.

ACTINODURA RAMSAYI RADCLIFFEI, Harington.

The Ruby Mines Bar-wing.

Harington, Bull., B. O. C., Cl. xiii., p. 9, 1910.

Description.—"Differs from *A. ramsayi* (Walden) in having the fore-part of the head and crest darker ferruginous, the general colour of the upper parts ochraceous, instead of cinereous olive-brown, and the throat, breast, and the sides of the body rich ochraceous : the abdomen is conspicuously white, and the feathers of the throat have rather conspicuous blackish shaft-streaks. Iris brown ; bill dark brown ; legs pale brown."

Total length about 9·7 inches, culmen 0·8, wing 3·6, tail 5·0, tarsus 1·2.

Habitat.—The only specimen procured as yet, is the type, which was shot by Major H. Delmè-Radcliffe in the Ruby Mines District, Upper Burma.

Ixops, Hodgson (1844).

Oates, F. B. I., i., p. 203.

"The genus *Ixops* resembles *Actinodura*, but has the tail rather shorter than the wing, and the tail feathers less graduated." (Oates).

I can find nothing recorded as to the nesting of this genus, except that it is said to build a saucer-shaped nest, the eggs most probably will be like the *Actinodura*.

KEY.

a.—Chin and throat the same colour as the breast.

*a*¹. Throat and breast not striped .. *I. n. nepalensis*.

*b*¹. " " striped.

*a*². Throat and breast greyish with dark stripes *I. n. daflaensis*.

*b*². Throat and breast rufous with chestnut stripes *I. n. waldeni*.

b.—Chin and throat chestnut, breast olive-grey .. *I. morrisoniana*.

Distribution.—*I. n. nepalensis*, Hodgson, Nepal, Sikhim, Butan ; *I. n. daflaensis*, Godwin-Austen, Daphla Hills ; *I. n. waldeni*, Godwin-Austen, Naga Hills ; *I. n. poliotis*, Rippon, Chin Hills ; *I. morrisoniana*, O. Grant, Formosa.

IXOPS NEPALENSIS NEPALENSIS, Hodgson.

The Hoary Bar-wing.

Cinclosoma nipalensis, Hodgson, As. Res., xix., p. 145 (1836).

Actinodura nipalensis, Sharpe, Cat., B. M., vii., p. 466.

Ixops nepalensis, Oates, F. B. I., i., p. 203.

Description.—As in Oates, F. B. I.

Distribution.—Nepal, Sikhim and Butan. Birds from Sikhim appear to be more rufous on the abdomen than the Nepal ones; more specimens are required from this last locality, as Hodgson's specimens are very worn, and I believe some of his localities are doubtful, as he collected both in Nepal and at Darjeeling.

IXOPS NEPALENSIS DAFLAENSIS, Godwin-Austen.

Austen's Bar-wing.

Actinodura daflaensis, Godwin-Austen, A. M. N. H. (4), xvi., p. 340 (1875).

Actinodura daflaensis, Sharpe, Cat., B. M., vii., p. 467.

Ixops daflaensis, Oates, F. B. I., i., p. 204.

Description.—As in Oates, F. B. I.

Distribution.—Daphla and Miri Hills.

IXOPS NEPALENSIS WALDENI, Godwin-Austen.

Walden's Bar-wing.

Actinodura waldeni, Godwin-Austen, P. Z. S. (1874), p. 46; Sharpe, Cat., B. M., vii., p. 465.

Ixops waldeni, Oates, F. B. I., i., p. 204.

Description.—As in Oates, F. B. I.

Distribution.—Japvo Peak; there are also 3 specimens from the Naga Hills and Manipur; these are more rufous below and show very little tract of streaking on the breast or low parts.

IXOPS NEPALENSIS POLIOTIS,* Rippon.

Rippon, Bull., B. O. C., xv., p. 97.

Very similar to *I. waldeni*, Godwin-Austen. Differs in having head darker, and crest darker edged with grey; ear-coverts ashy, instead of silvery-grey.

I do not consider this a good sub-species, and can see very little difference between it and *I. waldeni*, of which there are only two specimens from the type locality. In fact there is much more difference between *I. waldeni* from Japvo Peak, of which there are two specimens, and the same species from Manipur and Naga Hills, of which there are three very poor specimens, than between typical *I. waldeni*, and *I. w. poliotis*, from the Chin Hills, of which there are numerous specimens in the British Museum.

YUHINÆ.

Have the following characteristics: wing and tail about equal; the first three primaries graduated; the head fully crested, the feathers of the crown lengthened; the nostrils overhung with hairs.

* IXOPS MORRISONIANA, O. Grant.

Actinodura morrisoniana, O. Grant, Bull., B. O. C., xvi., p. 119 (1906); Ibis (1907), p. 185.

Distribution.—Mt. Morrison, Formosa.

KEY.

a.—Bill slender and gently curved.

*a*¹. Upper plumage not green *Yuhina*.

*b*¹. „ „ green *Herpornis*.

b.—Bill stout and straight.

*c*¹. Tail square *Ixulus*.

*d*¹. Tail graduated *Staphidia*.

YUHINA, Hodgson (1836).

Oates, F. B. I., i., p. 211.

“In *Yuhina* the bill is about two-thirds the length of the head, greatly curved and sharply pointed; the frontal hairs and the rictal bristles are well developed, and the nostrils are covered by a large membrane. The head is fully crested. The tail is rather short and perfectly square.” (Oates).

The wing is roundish with the first three primaries graduated, the fourth and fifth equal and longest; wing and tail about equal in length.

This genus is found along the Himalayas from Garhwal, to Assam and Burma, and thence into China.

They build flimsy cup-shaped nests and lay very highly coloured eggs, a pale blue green with numerous brown spots.

YUHINA GULARIS GULARIS, Hodgson.

The Stripe-throated Yuhina.

Hodgson, As. Res., xix., p. 166 (1836); Sharpe, Cat., B. M., vii., p. 631; Oates, F. B. I., i., p. 211.

Description.—As in Oates, F. B. I.

Distribution.—Nepal, Sikhim, Butan, Naga and Manipur Hills.

YUHINA GULARIS YANGPIENSIS, Sharpe.

Sharpe's Yuhina.

Sharpe, Bull., B. O., xiii., p. 11.

Description.—Similar to *Y. gularis*, Hodgson, differs in having upper plumage olive-brown instead of fulvous-brown, tail-coverts a very much paler olive tinge than the back; the crest brown tinged fulvous instead of a clear brown. Measurements as in *Y. gularis*.

“Legs and feet orange, upper mandible black, lower horny.” (Rippon).

The type is from Yangpi, Talifu road, 5,300 ft., Yunnan. There are several similar birds collected by Col. Rippon from Mt. Victoria, Chin Hills. The birds from Naga hills are probably this sub-species which is very hard to separate from *Y. gularis*.

YUHINA OCCIPITALIS, Hodgson.

The Slaty-headed Yuhina.

Hodgson, As. Res., xix., p. 166 (1836); Sharpe, Cat., B. M., vii., p. 633; Oates, F. B. I., i., p. 212.

Description.—As in Oates, F. B. I.

Distribution.—Nepal, Sikhim and Butan.

YUHINA DIADEMATA AMPELINA, Rippon.

Rippon's Yuhina.

Rippon, Bull., B. O. C., xi., p. 12.

Harington, J., B. N. H. S., xix., p. 119; *ibid*, Ibis, 1914, p. 13.

Description.—Similar to *S. diademata*, Verr, but darker especially on the crown and throat. Measurements the same as *diademata*.

Distribution.—Yunnan and the Bhamo Hills (originally described from Warabum, E. of Bhamo and not *S. Shan States*, as entered on label of type specimen.)

Nesting and Habits.—"It is very Tit-like in its habits and notes, and continuously raises its crest and so reveals the conspicuous white patch at the back of its head. I found several nests during April at Sinlum, Bhamo District, these were all placed between the upright stems of wild raspberry bushes, from 3 to 4 feet from the ground, and were very flimsy affairs, made entirely of some black roots. The eggs, of which two seem to be the usual number, are very like small editions of *Copsychus saularis*, being of a greenish-blue ground-colour profusely spotted, more especially at the larger end, with amber-spots. Average of seven eggs = $\cdot 76 \times \cdot 60$, largest = $\cdot 80 \times \cdot 60$ smallest = $\cdot 75 \times \cdot 58$.

YUHINA NIGRIMENTUM NIGRIMENTUM,* Hodgson.

The Black-chinned Yuhina.

Polyodon nigrimentum, Hodgson in Gray's Zool. Misc., p. 82 (1844).

Yuhina nigrimentum, Sharpe, Cat., B. M., vii., p. 633; Oates, F. B. I., i., p. 212.

Description.—As in F. B. I.

Distribution.—The Himalayas from Sarawal to the Dafla Hills, the Naga and Manipur Hills.

IXULUS, Hodgson (1844).

Oates, F. B. I., i., p. 216.

"*Ixulus* resembles *Yuhina* in every thing except the shape of the bill, which in *Ixulus* is shorter, deeper, and more curved at the tip." (Oates).

They have the following characteristics: wing more or less rounded, the first three primaries graduated, the fourth and fifth equal and largest; tail and wing about equal; rictal bristles weak; a few hairs overhanging the nostrils; and head crested.

They range from the N. W. along the Himalayas into Assam and Burma, and from thence to China.

KEY.

Oates, F. B. I., i., p. 217.

A.—Nape white *I. occipitalis*.

B.—Nape without any white.

a¹. A distinct collar round neck.

a². A rusty yellow collar on hind neck .. *I. f. flavicollis*.

b². A bright chestnut collar on hind neck .. *I. f. harterti*.

b¹. No collar.

c². Crown and back brown .. *I. h. humilis*.

d². Crown brown, back greyish .. *I. h. clarkii*.

IXULUS OCCIPITALIS, Blyth.

The Chestnut-headed Ixulus.

Siva occipitalis, Blyth, J., A. S. B., xiii., p. 937 (1844).

Ixulus occipitalis (Sharpe), Cat., B. M., vii., p. 613; Oates, F. B. I., i., p. 217.

*YUHINA NIGRIMENTUM PALLIDA, De La Touche.

Rickett and De La Touche. Bull., B. O. C., vi., p. 50.

Description.—Larger than *Y. nigrimentum*, Hodgson, wing up to 59 mm. in *Y. nigrimentum* wing up to 55 mm. The underparts not fulvous, but greyish-olive.

Habitat.—Kuatun, China.

Description.—As in Oates, F. B. I.

Distribution.—Himalayas, from Nepal to the Daphla Hills.

**IXULUS FLAVICOLLIS FLAVICOLLIS*, Hodgson.

The Yellow-naped Ixulus.

Yuhina flavicollis, Hodgson, As. Res. xix., p. 167 (1836).

Ixulus flavicollis, Sharpe, Cat., B. M., vii., p. 612; Oates, F. B. I., i., p. 218.

Description.—"Above obscure, with a slaty tinge; cap pure rich brown; cheeks and nape paler; back of the neck *rusty yellow*, continued in a collar round the sides and front of the neck, and thence spread over the lower surface of the body and diluted often to white; Chin, throat, and moustache dark brown; remiges and rectrices internally dusky; the primaries edged externally with white on the outer webs, and all pale internally on the inner; lining of wings white; sides of body shaped with brownish; legs yellowish fleshy grey; bill fleshy brown; iris brown; head crested; size $5\frac{1}{4}$ "; "Nepal." (Hodgson).

Birds from Simla—

Are very pale in colour, the collar showing traces of white at the sides. The tertiaries conspicuously tipped with white.

Birds from Naini Tal—

The same but tertiaries not tipped with white.

Birds from Nepal to Bhutan—

The same pale coloured collar.

Birds from Mt. Victoria—

Almost similar to those from Nepal.

Birds from Assam—

Almost identical with *I. r. harterti*, collar a rich chestnut.

Distribution.—The Himalayas from the Sutlej Valley to Bhutan, appearing again in the Chin Hills; birds from Assam have a very chestnut collar and are the next sub-species.

IXULUS FLAVICOLLIS HARTERTI, Harington.

The Chestnut-naped Ixulus.

Harington, Bull., B. O. C. xxxiii., p. 62 (1913).

Description.—*Adult*: Similar to *I. flavicollis*, Hodgson, from Nepal, but differs in having the crest of a darker and richer brown; the collar of a deeper and brighter chestnut, and the back of a much darker olive-brown. In *I. flavicollis* the collar is pale rufous.

Habitat.—The Bhamo Hills and Trans-Salween Shan States, Burma.

Type in the Tring Museum: No. 232. ♀. Sinlum, Bhamo, 25-4-08. H. H. Harington coll.

Obs.—Birds from Assam are almost identical with examples from Burma; those from the Chin Hills (Mt. Victoria) approach nearer to *I. flavicollis* from Sikhim.

* *Ixulus flavicollis baileyi*, S. Baker. Bull., B. O. C., xxxv, p. 17, 1914. "General plumage paler than in *I. f. flavicollis* and the white sharp lines extending over the whole of the upper parts instead of being confined to the scapulars and upper back; ear-coverts pale grey instead of pale bronze brown as in *I. f. flavicollis* and the brown of the crown and crest much paler and duller, with pronounced pale shafts to the feathers.

Habitat.—Mishmi Hills.

[The above was published after Maj. Harington's paper was in type and it has not been possible to add this new race to the key.—Eds.]

This is a very common little bird up at Sinlum-kaba in the Bhamo Hills. It has not been recorded from the Southern Shan States, but re-appears on the Salween-Mekong water shed in Keng-Tung State.

I found its nest at Sinlum, this was cradle-shaped and composed of moss. The eggs are identical with those *I. f. flavicollis*, that species is said to either build a cradle-like nest or place its nest on the ground.

IXULUS HUMILIS HUMILIS, Hume.

Davison's Ixulus.

Ixulus humilis, Hume, St. Frs., v., p. 106 (1877); Sharpe, Cat., B. M., vii., p. 614; Oates, F. B. I., i., p. 218.

Description.—As in Oates, F. B. I.

Distribution.—Muleyit Mt., Tenasserim.

IXULUS HUMILIS CLARKII,* Oates.

Oates' Ixulus.

Oates, Bull., B. O. C., iii., p. 41 (1894); Ibis (1894), p. 481; Blanford, F. B. I., iv., App., p. 481; Bingham, Ibis. (1903), p. 591.

Description.—As in F. B. I.

A rare bird at present, only recorded from Byingyi, an isolated hill of 6,200 ft., situated on the edge of the Shan Plateau, where it has been obtained both by Mr. Oates and Col. Bingham. It possibly extends into Karennee.

"I found this bird very common on Byingyi, in small parties, searching the blossoms of small trees for insects." (Oates, Ibis, 1894.)

STAPHIDIA, Swinhoe (1871).

Staphidia have the following characteristics: wing the *first three* primaries graduated, the fourth and fifth equal and longest; wing and tail about equal in length, the latter greatly graduated; nostrils overhung by hairs; rictal bristles short and weak; head crested.

KEY.

- A. A distinct chestnut collar *S. torqueola*.
- B. Collar indistinct or wanting.
 - a¹. Crown and nape bright chestnut *S. everetti*.
 - b¹. Crown rufous, nape same colour as back.. *S. castaneiceps*.
 - c¹. Crown dark grey, a white supercilium .. *S. rufigenis*.
 - d¹. Crown dark-brown, no white supercilium *S. striata*.

STAPHIDIA CASTANEICEPS, Moore.

The Chestnut-headed Staphidia.

Ixulus castaneiceps, Moore, P. Z. S. (1854), p. 141.

Staphidia castaneiceps, Sharpe, Cat., B. M., vii., p. 616; Oates, F. B. I., i., p. 205.

Description.—As in Oates, F. B. I.

Distribution.—The Garo, Khasia, Naga, Manipur and Chin Hills.

Nesting.—(See J., B. N. H. S., vol. viii).

* IXULUS ROUXI, Oustalet.

Oustalet, Mus. Paris, 1896, p. 186.

Habitat.—W. China and Yunnan.

STAPHIDIA STRIATA RUFIGENIS, Hume.

Hume's Staphidia.

Ixulus rufigenis, Hume, St. Frs. v., p. 108 (1877); Sharpe, Cat., B. M. vii., p. 617; Oates, F. B. I., i., p. 206; Rippon, Ibis, 1901, p. 533.

Description.—As in Oates, F. B. I.

Distribution.—Sikkim, Bhutan, and hill ranges of Assam. Also said to occur in the Shan States. I think that all the *Staphidia* procured on the eastern side of Burma are the next sub-species, *S. s. striata*, as a specimen of mine from the Bhamo Hills, and those in the B. Museum from the Shan States are all very similar, and much nearer to *S. s. striata* from Karennee than to *S. s. rufigenis* from Sikkim.

Nesting.—Baker, Ibis, 1906, p. 110, says it builds in holes of banks, making a nest of moss and leaves lined with fibres. The eggs are whitish spotted brown, and measure $\cdot 58$ to $\cdot 57 \times \cdot 50$ inches.

STAPHIDIA STRIATA STRIATA, *Blyth.

Tickell's Staphidia.

Ixulus striatus, Blyth, J., A. S. B., xxviii., p. 413 (1859).

Staphidia striata, Sharpe, Cat., B. M., vii., p. 617; Oates, F. B. I., i., p. 206; Bingham, Ibis (1903), p. 590; Harington, Ibis (1914), p. 14.

Oates is not very clear in his description of this species, never having seen it. Fortunately there are several specimens now available both in the British Museum and at Tring. To make matters more certain Mr. O. Grant kindly procured Count Salvadori's specimen for me to compare with mine. This bird is said to be identical with Fea's birds from Tenasserim.

Description.—"General colour above dull olive-brown; head darker with a greyish tinge, in some specimens a sooty-brown. The feathers of the head mantle and back with white shaft stripes. Ear-coverts dull chestnut, sides of the neck faintly tinged with the same. Wings and tail the same colour as the back but darker. The three outer tail feathers broadly tipped with white, under parts dull greyish-white. Length about 5, wing $2\cdot 37$ inches and tail the same."

In fact *S. striata* is very similar to *S. rufigenis*, but has the head browner; and the grey supercilium with rufous band above wanting, and has an indistinct rufous collar at the back of the neck.

The ear-coverts seem to vary from a dull chestnut to a bright chestnut similar to *S. rufigenis*.

Distribution.—Originally described from Tenasserim, has since been procured at Thandoung near Toungoo, where it is fairly common; and at Byingyi. It no doubt occurs in suitable localities along the eastern hills in Burma up to the Bhamo District.

Nesting.—Builds a mossy nest lined with fibres, which is placed in a hole of a bank or cutting eggs similar to *S. rufigenis*. The Hon. Mr. S. M. Robinson informs me in a letter, that he found this little bird very common

* STAPHIDIA TORQUEOLA, Swinhoe.

Swinhoe, A. M. N. H. (4), p. 174 (1870); Sharpe, Cat., B. M., vii., p. 615.

Distribution.—W. Fokien, China.

STAPHIDIA EVRETTI, Sharpe.

Sharpe, Ibis, 1887, p. 447.

Distribution.—N. W. Borneo.

up at Thandoung in the Shan States, where he found several nests. It appears to be very partial to nesting in certain favourable spots, many nests being found close together. Also that they seem to desert their nest for no apparent cause, as he found many nests deserted containing 2 and 3 eggs.

HERPORNIS, Hodgson (1844).

Oates, F. B. I., i., p. 219.

"In *Herpornis* the bill is nearly as long as the head, slender but well bent down at the tip; the nostrils are covered by a few frontal hairs, and the rictal bristles are strong; the head is crested; the wing is rather long and pointed and the tail perfectly square."

The plumage green. (Oates).

HERPORNIS XANTHOLEUCA, Hodgson.

The White-bellied Herpornis.

Erpornis xantholeuca, Hodgson, J., A. S. B., xiii., p. 380 (1844).

Herpornis xantholeuca, Sharpe, Cat., B. M., vii., p. 636; Oates, F. B. I., i., p. 219.

Description.—As in Oates, F. B. I.

Distribution.—Himalayas, Nepal to Assam, Cachar, Manipur, the whole, of Burma, and extending down the Malay Peninsula.

I can find nothing recorded as to its nidification, although its eggs have been taken.

Family—LIOTRICHIDÆ.

Seves dissimilar; habits arboreal; size small; bill short; wing and tail about equal.

This sub-family consists of a collection of small birds only having the above points in common. Dr. Sharpe has removed a great number of genera, which were included by Mr. Oates; I think the following should also be removed, *Cutia*, *Pteruthius*, *Hilarocichla*, and possibly *Myzornis*, only leaving the following three genera, which are true *Timeliidæ*, *Mesia*, *Liothrix* and *Minla*.

LIOTHRIX, Swainson.

Oates, F. B. I., i., p., 221.

The genus *Liothrix* consists of one species, and its two geographical races, and is characterised by its forked tail, the feathers of which are bent outwards.

LIOTHRIX LUTEA CALIPYGUS, * Hodgson.

The Indian Liothrix.

Bahila callipyga, Hodgson, Indian Rev. (1838), p. 88.

Liothrix lutea, Sharpe, Cat., B. M., vii., p. 644. Oates, F. B. I., i., p. 221.

Description.—As in Oates, F. B. I.

* LIOTHRIX LUTEAS LUTEAS, Scop.

The Chinese Liothrix.

Sylvia lutea.—Scop Del. Flor et Faun Insule, ii., p. 96 (1786).

Liothrix lutea, Seebhom, P. Z. S., 90, p. 343.

Habitat.—China.

The sub-specific name *lutea* belongs to the Chinese race which differs from the Indian, in having the tail more forked, and a decided red patch in the middle of the primaries, very similar to that of *M. argentauris*.

Distribution.—The Himalayas, Simla to Bhutan, the Assam Hills, and possibly the Chin Hills, also in the Bhamo Hills, where I procured it.

MESIA, Hodgson (1838).

Oates, F. B. I., i., p. 244.

"The genus *Mesia* contains two species, one of which is found within our limits. The coloration of this genus is very pretty."

"In *Mesia* the bill is stout, about half the length of the head, slightly notched near the tip, and with the culmen curved; the nostrils are covered by a peculiarly shaped membrane, and the rictal bristles are strong. The head is sub-crested; the wing rounded; the tail very slightly graduated, and the foot strong." (Oates).

MESIA ARGENTAUROS, Hodgson.

The Silver-eared Mesia.

Mesia argentauris, Hodgson, Ind. Rev. (1838), p. 88; Sharpe, Cat., B. M., vii., p. 642; Oates, F. B. I., i., p. 244.

Description.—As in F. B. I.

Distribution.—The Himalayas from Garhwal to Assam and Manipur, the Bhamo, Shan States and Karennee down to Tenasserim.

MINLA, Hodgson (1838).

Oates, F. B. I., i., p. 245.

"The genus *Minla*, as I restrict it, contains one Indian bird of pleasing plumage, found on the Himalayas and on some of the hill-ranges of Assam."

"In *Minla* the bill is slender, curved, notched and pointed. The head sub-crested, the wing rounded, and the tail, which is as long as the wing, slightly graduated." (Oates).

MINLA IGNEITINCTA,* Hodgson.

The Red-tail Minla.

Hodgson, Ind. Rev. (1838), p. 33; Sharpe, Cat., B. M., vii., p. 606; Oates, F. B. I., i., p. 245.

Description.—As in Oates, F. B. I.

Distribution.—Nepal, Sikhim, Bhutan, Manipur, the Naga Hills, and Bhamo Hills.

MYZORNIS, Hodgson (1843).

Oates, F. B. I., i., p. 233.

"In *Myzornis* the bill is slender and nearly as long as the head, distinctly notched, with the culmen gently curved, the nostrils are longitudinal and covered by a membrane; the rictal bristles weak. The head is not crested, but the feathers of the crown somewhat lengthened. The wing is round; the tail is about two-thirds the length of the wing and slightly rounded, and the tarsus is long and slender." (Oates).

* *M. jerdoni*, Verreaux.

Verr. Nouv. Arch. Mus., vi., Bull., p. 38 (1870).

Habitat.—Szechuen, W. China.

MYZORNIS PYRRHURA, Hodgson.

Hodgson, J., A. S. B., xii., p. 984 (1843); Sharpe, Cat., B. M., vii., 635; Oates, F. B. I., i., p. 233.

Description.—As in Oates, F. B. I.

Distribution.—Nepal and Sikhim. Nothing authentic appears to be recorded about its nidification.

CUTIA, Hodgson (1836).

Oates, F. B. I., i., p. 222.

The genus *Cutia* is remarkable for the great development of the tail-coverts, which reach nearly to the tip of the tail. The genus contains only one species, both sexes of which are very handsomely coloured." (Oates).

This is most certainly a non-Timeliine species, and I think should be removed from the family. Nothing appears to be recorded as to its habits and nidification, which might throw some light as to which family it should belong.

CUTIA NEPALENSIS, * Hodgson.

Hodgson, J., A. S. B., v., p. 774 (1836); Sharpe, Cat., B. M., vii., p. 646; Oates, F. B. I., i., p. 222.

Description.—As in Oates, F. B. I.

Distribution.—The Himalayas from Nepal to the Daphla Hills, the Assam, Manipur, Naga, Chin Hills, and Shan Hills to Karennee.

Note.—Birds from Mt. Victoria Chin Hills are very much paler above, and not so heavily barred on the flanks, the tail-coverts also much paler.

PTREUTHIUS.

Oates, F. B. I., i., p. 223.

"The bill is about one-half the length of the head, strongly hooked at the tip, and with the margins sinuated; the rictal bristles are weak. The nostrils are oval and partially covered by the frontal bristles, which are well developed. The feathers of the crown are somewhat ample, but they do not form a crest." (Oates.)

"The wing is rounded, the tail is about two-thirds, the length of the wing and slightly rounded, and its coverts reach to the middle of the tail. The tarsus is strong and smooth." (Oates.)

The Shrike-Tits are most certainly non-Timeliine, and I think should be placed near the Wood-Shrikes (*Tephrodornis*), whom they resemble, in structure, habits, and nidification, only differing in the sexes being dissimilar in plumage.

KEY as in F. B. I.

PTREUTHIUS ERYTHROPTERUS, Vigors.

Lanius erythropterus, Vigors, P. Z. S. (1831), p. 22.

Pteruthius erythropterus, Gadow, Cat., B. M., viii., p. 113; Oates, F. B., i., p. 224.

Description.—As in Oates, F. B. I.

Distribution.—The Himalayas, Hazara to Assam, Manipur, Naga and Chin hills.

* CUTIA CERVINICRISSA, Sharpe.

P. Z. S. (1888), p. 276.

Habitat.—The mountains of Perak, Malay Peninsula.

PTERYTHIUS ÆRALATUS ÆRALATUS,* Tickell.

Tickell's Shrike-Tit.

Tickell, J., A. S. B., xxiv., p. 267 (1855) ; Gadow, Cat., B. M., viii., p. 114 ; Oates, F. B. I., i., p. 225.

Description.—As in Oates, F. B. I.

Distribution.—The Hills on the eastern side of Burma from the Myit Kyina District down to the Malay Peninsula.

PTERUTHIUS MELANOTIS MELANOTIS, Hodgson.

The Chestnut-throated Shrike-Tit.

Hodgson, J., A. S. B., xvi., p. 448 (1847) ; Gadow, Cat., B. M., viii., p. 117 ; Oates, F. B. I., i., p. 226.

Description.—As in Oates, F. B. I.

Distribution.—Himalayas, Nepal to Assam, Manipur and Naga Hills.

PTERUTHIUS MELANOTIS INTERMEDIUS, Hume.

Hume's Shrike-Tit.

Allotrius intermedius, Hume, S. F. V., p. 112 (1877).

Ptererythrius intermedius, Gadow, Cat., B. M., viii., p. 117 ; Oates, F. B. I., i., p. 227.

Description.—As in Oates, F. B. I.

Distribution.—The Eastern hills of Burma from Bhamo to Tenasserim.

PTERUTHIUS XANTHOCHLORIS XANTHOCHLORIS, Hodgson.

The Green Shrike-Tit.

Hodgson, J., A. S. B., xv., i., p. 448 (1847) ; Gadow, Cat., B. M., viii., p. 118 ; Oates, F. B. I., i., p. 227.

Description.—As in Oates, F. B. I.

Distribution.—Nepal and Sikhim.

PTERUTHIUS XANTHOCHLORIS OCCIDENTALIS, Harington.

The Simla Shrike-Tit.

Harington, Bull., B. O. C., xxxiii, p. 81 (1913).

Description.—"Similar to *P. x. xanthochloris*, Hodgson, but the male has the crown and nape pale ash-grey instead of blackish. In the female the head is greenish, with a wash of grey instead of dark grey."

"Mr. Oates has already drawn attention to the fact that birds from Nepal and Sikhim have the head much darker than those from the N. W. Himalayas." (Harington).

Distribution.—The N. W. Himalayas.

* *P. æralatus ricketti*, O. grant.

Bull. B. O. C., xiv., p. 92.

Habitat.—South China, Kuatun, Foh-kien and S. Yunnan.

Also the following are recorded:—

P. cameranoi, Salvadori, Sumatra.

P. tahanensis, Hartert, Malay Peninsula.

P. flaviscapus, (Temm) Java.

P. ænobarbus, (Temm) Java.

* *PTERUTHIUS XANTHOCHLORIS HYBRIDA*, Harington.

The Chin Hills Shrike-Tit.

Harington, Bull., B. O. C., xxxiii., p. 81. (1913).

Description.—Intermediate between *P. x. pallidus*, David, from China and *P. x. xanthochloris*, Hodgson, from Nepal, having the white ring round the eye of the former, but the grey of the head confined to the crown and nape, and not extending on to the upper back as in the former species. The colouration of the under parts is similar to that of *P. x. xanthochloris*.

Habitat.—Mt. Victoria Chin Hills.

HILAROCICHLA, Oates (1889).

Oates, F. B. I., i., p. 243.

Mr. Oates has separated off this species from the other Shrike-Tits (*Pteruthius*) on account of its longer tail. But why he should have called it a "Laughing Thrush," and thus taken a very good generic name, which would have been most useful in dividing off the *Garrulax*, is difficult to say.

HILAROCICHLA RUFIVENTER, Blyth.

Pteruthius rufiventer, Blyth, J., A. S. B., xi., p. 18 (1843); Gadow, Cat. B. M., viii., p. 115; Oates, F. B. I., i., p. 243.

Description.—As in Oates, F. B. I.

Distribution.—Nepal, Sikhim, Naga and Chin Hills.

* *P. X. PALLIDUS*, David and Oustalet.

David, Ois. Chini, p. 215.

Habitat.—Foh-kien and Yunnan.

Differs from *P. x. xanthochloris*, in having a white ring round the eye, the grey of the head confined to the nape, and the flanks greenish-yellow.

A REVISION OF THE GENUS *GENNÆUS*.

BY

E. C. STUART BAKER, F.Z.S., F.L.S., M.B.O.U.

(With 3 Plates and 2 Maps.)

Since 1890, consequent upon the opening up of Burmah and the adjacent States, more especially the Eastern Chin Hills, Shan States, and other districts in the East and North-East, a great number of skins have been obtained of both Kalij and Silver Pheasants, species which had hitherto been represented in Museums by very few specimens. From time to time, as these skins came to hand, many species were described as new, generally upon single specimens only, and sometimes upon mere fragments. In regard to some of the species thus named, the receipt of further material has rendered naturalists, including those responsible for the new names, doubtful as to the specific value of the alleged differences.

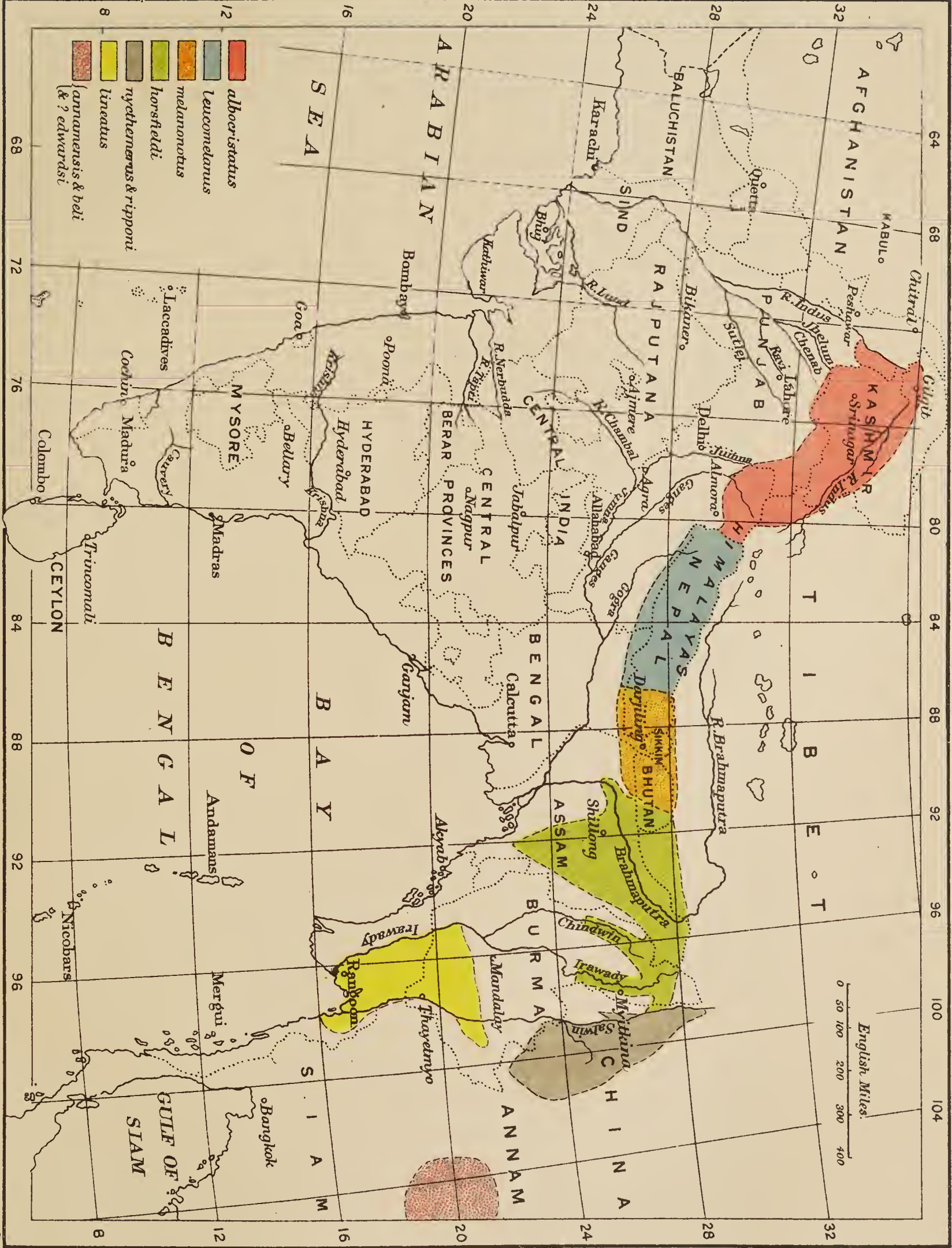
In 1909, Professor Ghigi attempted a revision of this genus in *Mem. Acad. Scient. Bologna*, pp. 133-174, and in this article accepts twenty-four species as good, besides describing a large number of individuals as hybrids. It is self-evident, however, that, at least in some cases, Ghigi had not before him the actual specimens upon which he discourses. Thus he dwells upon the supposed differences between *Gennæus jonesi* and *Gennæus ripponi*, although these two so-called species are described, by Oates and Sharpe respectively, from one and the same skin.

Further, we find that in some cases members of the same brood have been divided into two or more species, whilst in yet other instances the cock and hen of a pair of birds have been considered to be different, possibly owing to the fact that at the time they were named, the conditions under which they had been shot were not known to the namer.

It appears therefore that a further revision of this beautiful genus is urgently required. Before, however, considering in detail which of the very numerous forms hitherto described as species are really entitled to this rank and which are, on the other hand, merely sub-species, hybrids or individual variations, it may be as well to consider briefly the genus as a whole, more especially in reference to the way in which these variations may have arisen.

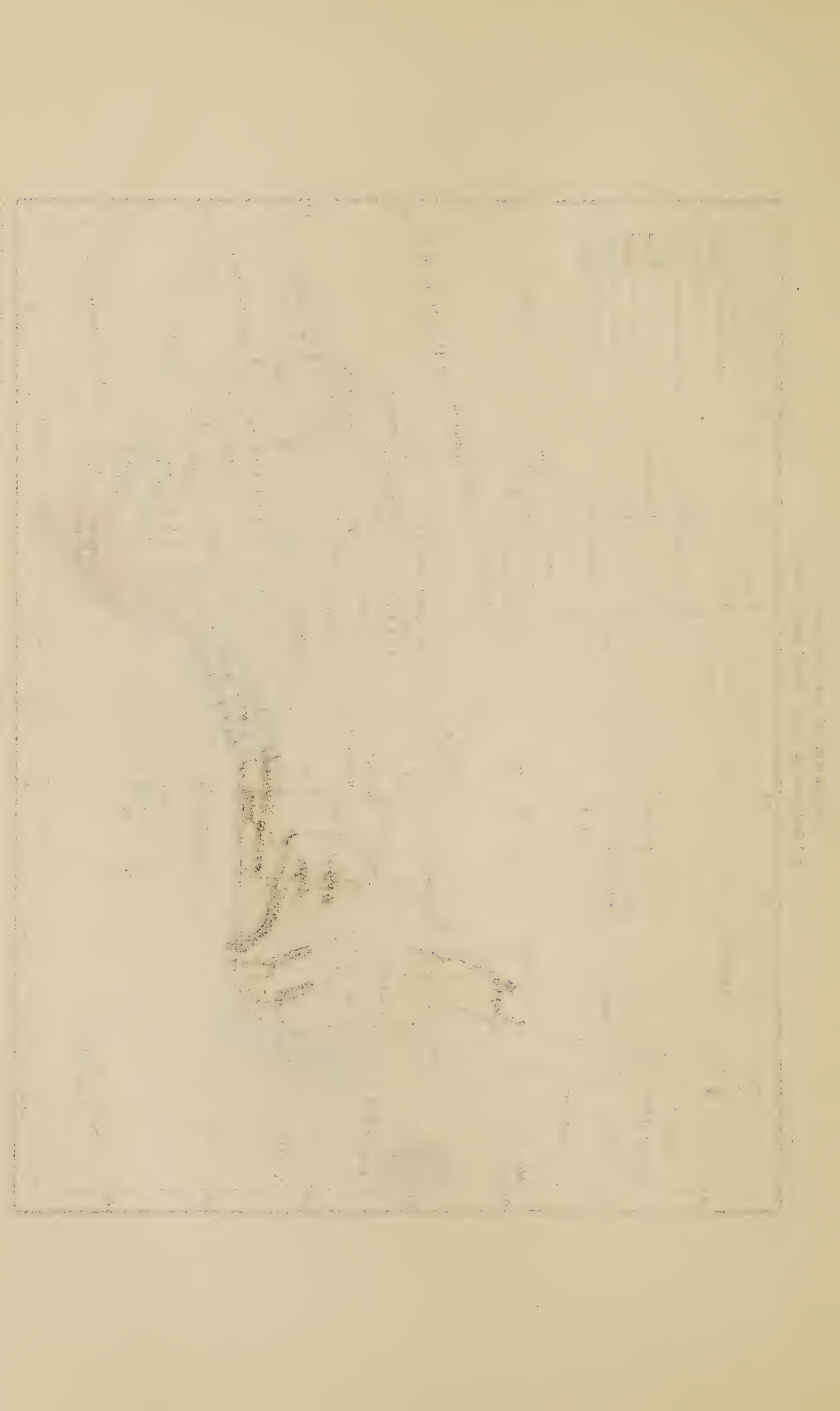
The genus *Gennæus* includes the birds generally known by the trivial names of Kalij and Silver Pheasants, and is one which gives a most interesting and, at the same time, exceptional insight into Nature's evolution of species and sub-species.

Amongst the pheasants we are considering, there appear to be three dominant types, the principal characteristics of which seem to



MAP SHEWING DISTRIBUTION OF SPECIES OF GENNAEUS.

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be connected with certain well-defined geographical and climatic factors.

The first type is that of the Kalij Pheasants, in which black on the upper plumage is the prevailing tint in the males; secondly, we have the birds of the *lineatus*, or Burmese Silver Pheasant, group, in which the upper plumage is grey, this tint being obtained by fine lines and vermiculations of black and white; and, thirdly, we have the *nycthemerus* or Chinese Silver Pheasant group, in which white greatly preponderates over the black.

There are thus three well-defined and constant forms to be found in three equally well-defined areas, but between these three forms and in intervening areas we come across numerous others, more or less stable, which link them together.

An examination of the country inhabited by the three principal forms shows that the following geographical and climatic factors appear to be the ones which are mainly instrumental in the determination of the characteristics peculiar to each species.

Thus we find that the black and very dark birds inhabit areas of dense forest at comparatively low elevations where there is a heavy rainfall, and which are therefore well provided with rivers, lakes and swamps. Next we see that the grey birds inhabit hills of moderate height covered with mixed forest, bamboos and grass lands, and with a moderate rainfall. Thirdly, we obtain the white birds only in hills and plateaus at a considerable elevation where the grass-covered and open country exceeds in extent the forest, and where the rainfall is light or even scanty.

We thus have it demonstrated that great humidity and heat, with its constant tropical growth of vegetation, induces black in the plumage of the birds of this genus, whereas the coldness of the higher mountains combined with a drier atmosphere and its consequent thinner forests and more open grass lands induces white. These four factors, temperature, humidity, elevation, and vegetable growth, we shall find, therefore, are the principal ones governing not only the differentiation of the species, but also of the intermediate sub-species. An examination of the maps accompanying this article will show how this reasoning is borne out, and will make it easier to understand.

It would seem very probable that in this genus the oldest form is *horsfieldi*, a species which has established itself over a very wide area, extending from the West of Assam right away to the North-West of the Shan States, wherever the valleys of the rivers afford it sufficient heat, humidity and cover. To the West we find it replaced by certain other forms, *albocristatus*, *leucomelanus* and *melanonotus*, birds which are very similar in general appearance, but with more white in the plumage of those which ascend to higher elevations. The differences in rainfall and vegetation are not,

however, in nearly so great a contrast as they are in the further East, hence the differences in plumage are themselves less startling.

To the South the extension of *horsfieldi* appears to have been very gradual, and the variations between the extremes of type, that is to say, between the black Kalij in the North and the grey Silver Pheasant in the South-East, have in some areas become practically constant and well-defined, and may, therefore, well rank as sub-species. Thus we have *cuvieri*, a very dark bird with a small amount of white vermiculation on the upper plumage, which acts as a sort of buffer state between *horsfieldi* and other forms in the South and East which more nearly resemble the true Silver Pheasants. This form extends from Arakan round in a rough horse-shoe to the North-West Shan Hills.

South of this as the Hills get higher and drier in the South Arakan Yomas, we get a paler bird, which is very close to *lineatus*, but is darker, and still shows signs of the white banded rump typical of true *horsfieldi*. This form has been named *oatesi* by Ogilvie-Grant, and is sufficiently constant in colouration throughout the Southern Arakan Yomas to deserve sub-specific rank. East of the Irrawaddy River we get into a region of higher hills with a smaller rainfall than on the West, and accordingly we here come on a yet paler form which has lost all trace of the barred rump, contrasting with the rest of the upper plumage. This is the true *lineatus*, and it is almost entirely confined to the Pegu Yomas running North and South between the Sittang and Irrawaddy Rivers.

Extension further South seems to have practically stopped at this point, and there then appears to have set in a new movement extending North and East.

That this extension in the East has not proceeded Southwards from the Himalayas simultaneously with that on the West is shewn by the fact that the greatest contrast between any two forms is that shown between *nycthemerus* and *horsfieldi*, which practically meet one another in the extreme North-East of the Silver Pheasants' habitat. Moreover, from the birds on the East we find that all trace of the barred rump so typical of *horsfieldi* has been eliminated, whereas this feature exists in all birds down the West Coast, and does not totally disappear until the true *lineatus* is reached.

Another feature which would seem to prove that extension has been South and then again North and East is shown by the fact that hybrids are far more numerous on the extreme North-East, at the point of contact between *nycthemerus* and *horsfieldi* than they are anywhere else. Had extension commenced working down the East, then hybrids would have disappeared in some intermediate form, or have become established as a definite sub-species.

Working North and East, we find the amount of white still gradually increasing in extent, until in the North we come to the

true *nycthemerus* and in the East to *whiteheadi*, magnificent birds in which the upper plumage at a slight distance appears to be pure glistening white. These birds, as we should expect, inhabit the highest elevation, and the most open country of all the Silver Pheasants.

In the country between these two birds and *lineatus* exist numerous varieties and forms, though it is here rather more difficult than in the West of Burmah to define many areas in which we can say that such and such a type will constantly be found to the exclusion of others.

To the East of the Pegu Yomas and across the Sittang River we have a dark bird, little whiter on the whole than *lineatus*, but with the character of the markings considerably altered, the fine vermiculations in that bird giving place to well-defined, though narrow, bars or lines of white and black. As regards the male of this form, it is difficult to distinguish it from the form of Silver Pheasant found to the due North of the range of *lineatus*, though it is on the whole darker, but the females are quite different, the underparts being red in *lineatus* and its Northern form, and almost black in this bird. It is therefore worthy of distinction as a sub-species, and will stand as *sharpei*.

To the East we pass through intervening forms which have been called *beli*, *annamensis* and *edwardsi* to *whiteheadi*. The last bird is mainly white, being distinguished at a glance by the great width and boldness of the few black bars on the tail and upper plumage. The intermediate forms between *whiteheadi* and *sharpei* are distinguished by the fact that they have far more white on the long feathers at the sides of the upper breasts, a few of their feathers being pure white, a feature which obtains only in these two forms, and in *whiteheadi*. The female of *annamensis* is like that of *horsfieldi* with the tail of *lineatus*. *Beli* and *annamensis* only differ in depth of colour, and it is doubtful if both are worthy of separation as sub-species; more material is required to settle this point.

I have not been able to examine the type of "*edwardsi*," but it will almost certainly prove to be different to either *beli* or *annamensis*, if these are themselves different to one another, but, if it is the same, *edwardsi* having been described in, 96 will have priority over the other names.

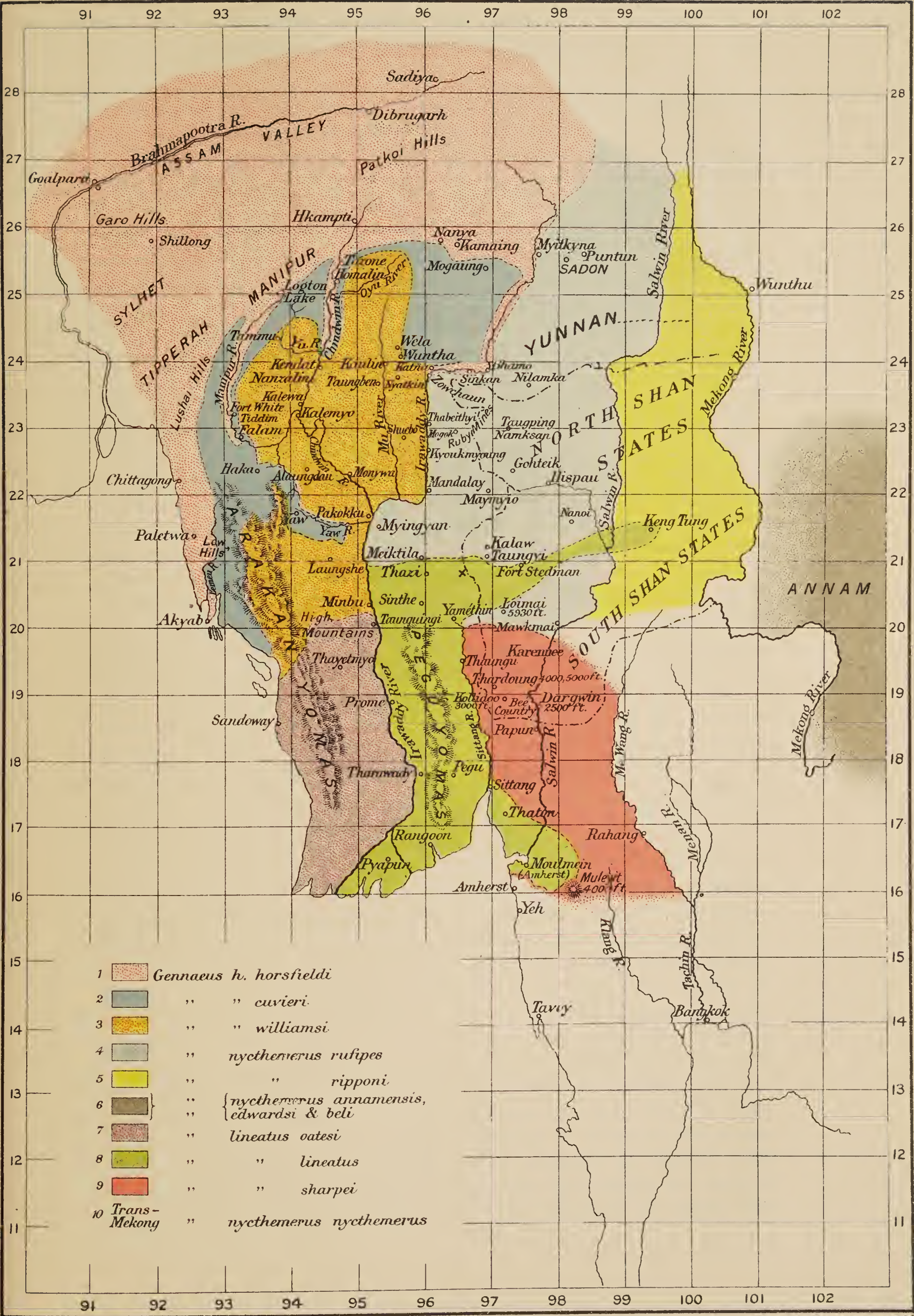
Further, due North, practically from latitude 21°, we have the multitude of so-called species named by Oates inhabiting the South and North Shan States. These different species, however, have often been named from specimens inhabiting the same place; sometimes, indeed, as in the case of *atlayi* and *rufipes*, from birds of the same flock, and it is quite impossible to recognize as valid the numerous names Oates has given.

Roughly speaking, as we work North and East, the birds become more and more white in plumage, and possibly also get a longer tail, but the whitest of those which Oates has named *jonesi* and Sharpe *ripponi* are, in a few cases, quite indistinguishable from a specimen of *nycthemerus* from as far East as Fokhien. It is therefore with some hesitation that I have given sub-specific rank to the very white birds with long tails which are found in the extreme North-East in the inter Salwin-Mekong District. As regards the birds inhabiting the Ruby Mines and country North, South, and East thereof, I consider that there are not at present grounds to differentiate more than one sub-species which will be Oates' *rufipes*, that name having priority amongst those not given to birds which are palpably hybrids.

Before, however, leaving this area, it is necessary to refer to the fact that we here find some birds with dark greenish and horn coloured legs, though the vast majority have them red. Oates has deemed this sufficient ground for differentiation into species, but it appears to me that the dark legs are due either to a throw back or to direct hybridization. Birds which cannot be otherwise distinguished, and which live at the same elevation, in the same forest or grass land, and shot on the same day, have in some cases had red, and in others dark coloured legs, and in one instance a fine male was shot which had one leg red and one dark horny green.

We must also remember that round this North-Eastern area a further complication in evolution has arisen, for, whilst the majority of birds have been extending due South from the normal habitat of *horsfieldi*, others have been extending South-East towards the Northern Shan States and here the Eastern extension meets that which has worked first South-East, and then North-East. Moreover, here also the extreme Eastern limit of the typical black *horsfieldi* runs into the area occupied by the typical white *nycthemerus*. True, these two species normally occupy areas of quite different elevation of country which contrast greatly with one another in their main characteristics, but all pheasants are great travellers and wanderers, and the numerous birds shot shewing self-evident signs of being hybrids prove that interbreeding does go on between the two species, due either to the one species wandering above, or the other descending below, its normal habitat.

In the second line of extension which has pushed from West to East, the forms attained to pass through *cuvieri*, to which I have already referred, to a very well-defined form, *williamsi*, inhabiting a tract of low and moderately high hills in the inter Manipur-Chindwin and Irrawaddy District. This form is a parallel evolution to that of *oatesi* on the South, but whereas some climatic factor has induced tiny bars and vermiculations in the South, in the East a



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MAP TO SHEW DISTRIBUTION OF SUB SPECIES OF GENNAEUS IN BURMAH & ADJOINING DISTRICTS.

somewhat similar grey tone has been evolved with the assistance of much broader bars and streaks of black and white.

The above then shows roughly how in the triangle containing Assam, the Northern Shan States and Tennasserim, certain species and sub-species of Pheasants have answered to the demands of evolution. But in addition to these which are worthy of specific and sub-specific rank there are a great number of specimens in Museums which shew by certain well-known signs that they are but hybrids, and many others which cannot with certainty be assigned to any recognized form, for every area inhabited by a species or sub-species, is surrounded by another area in which the governing factors are themselves intermediate, and are not sufficiently strong to determine to which species or sub-species the birds inhabiting it shall belong.

Where also the change in the characteristics of a country is very abrupt, in consequence of which two very different forms of Pheasant closely approach one another, at this point of contact there will be found a comparatively large number of specimens which are the result of hybridization pure and simple rather than of the gradual formation of a new sub-species.

In the Shan States man has proved a recent additional factor in the differentiation of form. He has cultivated highlands which were originally under forests, but has then deserted this cultivation and left behind him wide extents of grass. In some cases he has thus adapted the country to such birds as seek the open, and in others he has driven the forest-loving birds into valleys and pockets so small that the surrounding forms are gradually, by constant hybridization, exterminating all signs of their origin.

This I have little doubt is the main cause, together with the fact that here three streams of extension meet, why we find such a curious medley of forms in the North-Western Shan States.

Finally, before leaving the consideration of the genus as a whole, it is necessary to emphasize two facts, first, that individual variation in both species and sub-species is very great, and, secondly, that alterations in plumage occur at every moult until the birds are two or three years old. In the male birds, these variations occur principally in the depth of the black and tone of its gloss, the width of the black and white markings, and, to a lesser degree, in their disposition and character. In females the differences consist principally in the general tone, varying from chestnut to dull grey brown, and in the breadth and darkness of the markings on the lower plumage; the tails in this sex perhaps vary more than the rest of the plumage and are sometimes almost a chestnut red, sometimes a dull brown, and sometimes well stippled or barred with darker marks. To work out the variations and assign to each a cause or an age is not possible with the material at hand, but

undoubtedly from what I have personally learnt from long residence in their country, it would seem that young birds are more chestnut than old ones, and that young cocks are brighter, darker, and more boldly marked than hens which they, otherwise, closely resemble.

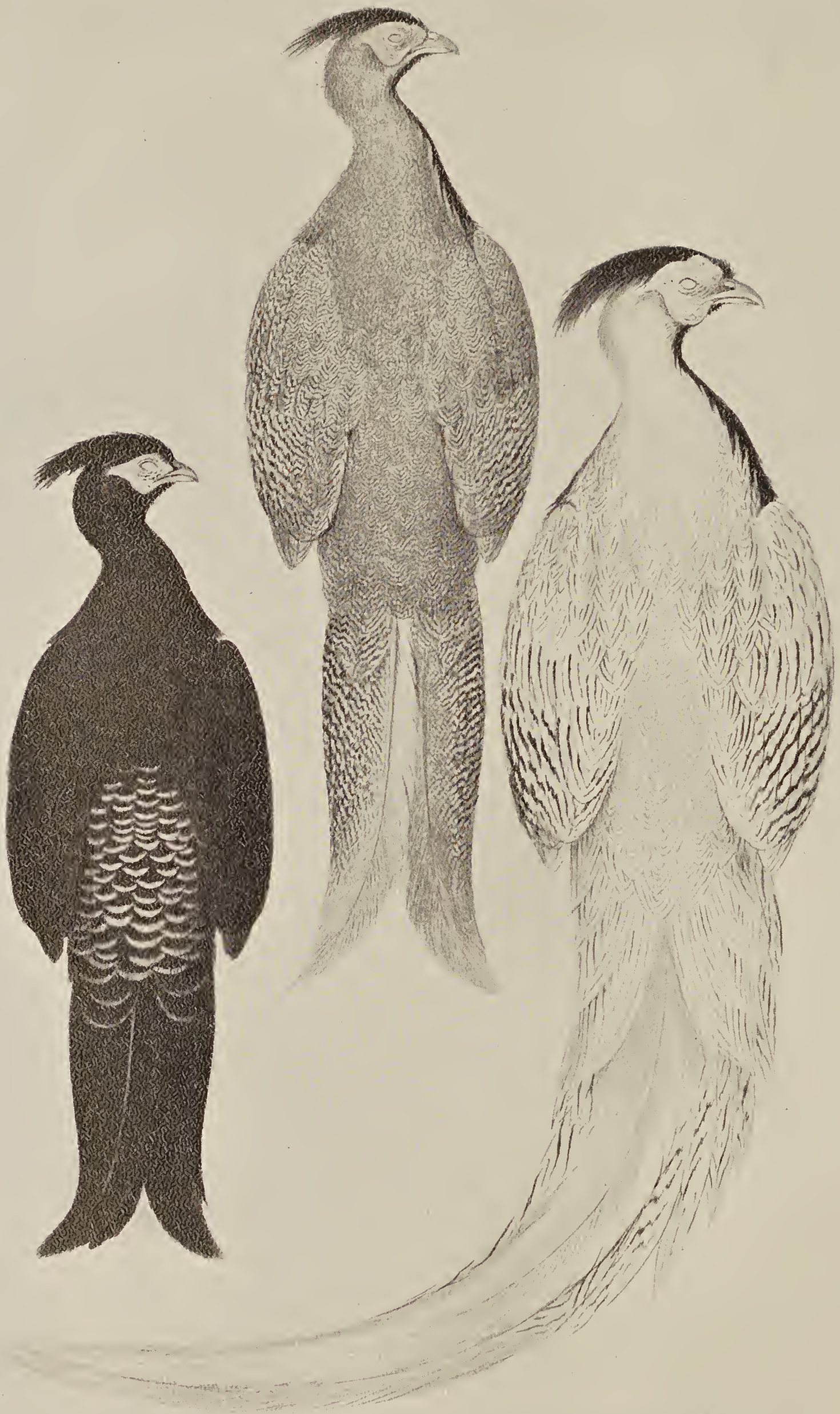
It will be seen that in the following pages I admit altogether only eight species of this genus, *Gennæus*, together with eight sub-species as follows :—

<u>Species.</u>		<u>Sub-species.</u>	
<i>albocristatus.</i>			
<i>leucomelanus.</i>			
<i>melanonotus.</i>			
<i>horsfieldi</i>	<i>cuvieri.</i>
			<i>williamsi.</i>
<i>lineatus</i>	<i>oatesi.</i>
			<i>sharpei.</i>
<i>nycthemerus</i>	<i>ripponi.</i>
			<i>rufipes.</i>
			<i>annamensis.</i>
			<i>beli.</i>
<i>(edwardsi?)</i>	<i>(edwardsi?)</i>
<i>whiteheadi.</i>			
<i>swinhoii.</i>			

As regards the sub-species, these are somewhat arbitrarily allotted to certain species, as in many cases they are half-way between two extreme forms, so that it is impossible to say to which they are nearest. This is especially the case in regard to *sharpei*, *annamensis* and *beli*. In general appearance these three are very closely allied and would at first sight appear to be sub-species of one and the same bird, and they might with equal reason be all placed under either *nycthemerus* or *lineatus*. Indeed the two latter might almost equally correctly be placed as sub-species of *whiteheadi*, a Pheasant inhabiting Hainan, an island far to the East of them, for they show a striking affinity to this bird in their white breast plumes. The present arrangement seems, however, to be on the whole the most convenient, and as all classification is, or should be, made entirely on the grounds of convenience, it is probably therefore the most scientific.

Of the species admitted *leucomelanus* alone is at all doubtful, and this bird may be considered by some people to be only a sub-species of *albocristatus*. Of the sub-species I consider *ripponi* and *cuvieri* to be rather weak, whilst of *beli*, *annamensis* and *edwardsi* two may have to be suppressed when more material is available.

Mr. E. W. Oates, who was responsible for the naming of the greater number of Silver and Kalij Pheasants which have been given



H. Grönvold, del.

G. horsfieldi.

G. liniatus.

G. nyctheremus.

specific rank, admitted no less than 36 species as good, not even eliminating *jonesi*, which, as I have already shown, he named from the same skin as that which Sharpe had already named *ripponi*.

Ogilvie-Grant, in Allen's Naturalists' Library, which was published in 1895, recognizes 8 species and 3 sub-species, but at this time material for comparison was scanty and even in the British Museum there was but little to work on.

Professor Ghigi, in the article to which I have alluded, gave specific rank to 24 species, and finally Sharpe, in his "Hand-List," has only allowed 16. The Hand-List, however, was also published as far back as 1899.

KEY TO SPECIES.

- A. Crest white *albocristatus*.
- B. Crest black.
 - a. Upper plumage black, feathers pale edged
and rump barred, breast white *leucomelanus*.
 - b. Upper plumage black without pale edges
and no bars on rump; breast white *melanonotus*.
 - c. Upper plumage black and rump broadly
barred with white; breast black... .. *horsfieldi*.
 - d. Upper plumage grey formed by tiny vermiculations
and bars of white and black *lineatus*.
 - e. Upper plumage almost white with sparse
narrow bars of black.
 - a¹. Tail with narrow bars of black; side
feathers of upper breast streaked with
white *nycthemerus*.
 - b¹. Tail with broad bands of black; side
feathers of upper breast pure white *whiteheadi*.
 - f. Scapulars crimson bronze *swinhoii*.

KEY TO SUB-SPECIES OF *Horsfieldi*.

- A. Upper plumage glossy black, rump boldly
barred black and white contrasting
strongly with back *horsfieldi*.
- B. Upper plumage with very fine vermiculations
of white, but rump with bold bars
contrasting strongly with back *cuvieri*.
- C. Upper plumage finely barred with black and
white, giving a general grey appearance,
rump barred black and white and contrasting
distinctly but not strongly with
back *williamsi*.

Euplocamus albicristatus, Oates, ed. Hume's Nests and Eggs, iii, p. 413 (1890).

Gallopheasis albocristatus, Mitch., P. Z. S. (1858), p. 544, pls. 148, fig. 1 and 149, fig. 3; Jerdon, Birds Ind., iii, p. 532 (1863); Hume, Nests and Eggs, Ind. B., p. 526 (1873); Marshall, Birds' Nests Ind., p. 58 (1877).

Gennæus albocristatus, Ogilvie-Grant, Cat. Birds, B. M., xxii, p. 298 (1893), id. Hand-List, Game B., i., p. 258 (1895).

Gennæus albicristatus, Oates, Man., Game B., i, p. 324 (1898); Blanf., Fauna. Brit. Ind., iv, p. 89 (1898); Oates, Cat. Eggs, B. M., i, p. 54 (1901); Rattray, J. Bomb. N. H. Soc., xvi, p. 663 (1905); Ghigi, Mem. Acad., Bologna (6), v, p. 145 (1908); Macgrath, J. Bomb. N. H. Soc., xviii, p. 298 (1908); "Pine Martin," J. Bomb. N. H. Soc., xix, p. 796 (1910).

Type.—In Indian Museum.

Description, adult male.—Crest white; head and upper parts black, upper back with white shafts and narrow pale edges; lower back, rump and upper tail coverts with white bars; lower parts brown, almost white on the long lanceolate feathers of the breast. Legs pale horny.

Adult female.—General plumage reddish brown, paler below; very faintly vermiculated throughout with blackish. Central tail feathers generally rufous or rufous brown with fine pale vermiculations, other rectrices almost black.

Distribution.—Along the Himalayas, from the Indus on the West to Nepal on the East, possibly entering it for a short way in the extreme East as far as the Gogra.

During the breeding season, this Pheasant is often found at great heights up to 10,000 feet, well into a comparatively dry, cold climate with light forest and much open country. To this doubtless is due the extent of white obtaining on the upper plumage. In winter it is found between two and five thousand feet.

GENNÆUS LEUCOMELANUS.

The Nepal Kalij Pheasant.

Phasianus leucomelanos, Lath, Ind. Orn., ii, p. 633 (1790).

Euplocomus leucomelas, Hodgs., in Gray's Zool. Misc., p. 85 (1844).

Gallopheasis leucomelanos, Gray, Gen. B., iii, p. 498 (1845); Hutton, J. A. S. B., xvii, pt. 2, p. 694 (1848).

Euplocamus leucomelanus, Hume, Str. Feath., vii, pp. 428-429 (1878); Hume and Marshall, Game B. Ind., i, p. 185, pl. (1878).

Gallopheasis leucomelanus, Scully, Str. Feath., viii., p. 345 (1879).

Gennæus leucomelanus, Ogilvie-Grant, Cat. Birds, B. M., xxii,

p. 300 (1893); id. Hand-List, Game B., i, p. 262 (1895); Oates, Man., Game B., i, p. 329 (1898); Blanf., Fauna. Brit. Ind., iv, p. 90 (1898).

Gennæus leucomelanos, Ghigi, Mem. Acad. Bologna (6), v, p. 145 (1908).

Description: adult male.—Similar to the White-crested Kalij but having the crest black and the white on the upper parts less in extent and less conspicuous.

Female.—Cannot be distinguished from that of *albocristatus*.

Distribution.—Nepal, from the foot of the hills up to about 6,000 feet, ascending as high as 9,000 feet.

This bird is exactly intermediate between *albocristatus* and *melanonotus*, approaching the former more nearly than the latter, for, in birds from the extreme West of its range, the crest will often be found to be brownish, and the extent of white more than normal, and again *albocristatus* in the East of that bird's range, instead of having the crest pure white, sometimes has it a pale brown. Some naturalists might, therefore, consider it a sub-species of that bird, but taking into consideration the great extent of country over which the colouration is quite constant, I retain it for the present as a species.

GENNÆUS MELANONOTUS.

The Black-backed Kalij Pheasant.

Phasianus muthura, Gray in Griffith's ed. Cuv., iii, p. 27 (1829).

Gallophasis muthura, Gray, Gen. B., iii, p. 498 (1845).

Euplocomus melanonotus (Blyth), Hutton, J. A. S. B., xvii, pt. 2, p. 694 (1848) (Darjeeling); Blyth, Cat. Mus. As. Soc., p. 244 (1849).

Gallophasis melanonotus, Mitchell, P. Z. S. (1858), p. 544, pl. 149, fig. 2; Jerdon, B. Ind., iii, p. 534 (1863); Hume, Nests and Eggs, Ind. B., p. 527 (1873); Marshall, B. Nests Ind., p. 59 (1877).

Euplocamus melanonotus, Hume and Inglis, Str. F., v, p. 42 (1877).

Euplocamus melanonotus, Hume, Str. Feath., vii, p. 429 (1878).

Euplocomus melanonotus, Hume and Marshall, Game Birds, India, i, p. 191 (1878); Oates, ed. Hume, Nests and Eggs, iii, p. 415 (1890).

Gennæus muthura, Ogilvie-Grant, Cat. Birds, B. M., xxii, p. 301 (1893); Ghigi, Mem. Acad. Bologna (6) v, p. 145 (1908).

Gennæus melanonotus, Ogilvie-Grant, Hand-List, Game B., i, p. 263 (1895); Oates, Man. Game Birds, i, p. 331 (1898); Blanf., Fauna. Brit. Ind., iv, p. 91 (1898); Oates, Cat. Eggs, B. M., i, p. 54 (1901).

Description: adult male, The whole upper plumage glossy black, the feathers with white shafts.

The Female.—Similar to that of *leucomelanus* and *albocristatus*.

Distribution.—From the extreme West of Sikkim and over the greater part of Western Bhutan. Generally speaking, it is not a bird of the highest elevations, being found between 1,000 and 4,000 feet, but ascends commonly up to 6,000, and sometimes as high as 9,000 feet. In the cold weather months it may be found occasionally as low down as the foot of the hills where the broken ground meets the plains.

GENNÆUS HORSFIELDI.

The Black-breasted Kalij Pheasant.

♂ Plate i, No. 1; ♀ Plate iii, No. 1.

Gallophasias horsfieldii, Gray, Gen. B., iii, p. 498, pl. cxxvi (1845).

Euplocomus horsfieldi, Blyth, Cat. Mus. Asiat. Soc., p. 244 (1849).

Euplocamus horsfieldi, Hume and Inglis, Str. Feath. v, p. 42 (1877); Hume and Marshall, Game B. Ind., i, p. 198, pl. (1878); Fasson, Str. Feath., ix, pp. 203-205 (1880); Hume, Str. Feath., xi, p. 303 (1888); Oates, ed. Hume's Nests and Eggs, iii, p. 416 (1890).

Euplocomus cuvieri, Hume and Marshall, Game B. Ind., i, pl. only (1878).

Euplocomus horsefieldi, Hume, Str. Feath., vii, p. 429 (1878).

Gennæus mearsi, Oates, Ann. Mag. N. H. (8) v, p. 164 (1910).

Gennæus prendergasti, Oates, J. B. N. H. S., xvii, p. 10 (1906); Ghigi, Mem. Acad. Bologna (6) v, p. 144 (1908).

Gennæus batemani, Oates, J. B. N. H. S., xvii, p. 11 (1906); Ghigi, Mem. Acad. Bologna (6) v, p. 145 (1908); Harington, J. Bomb. N. H. Soc., xx, p. 377 (1910).

Gennæus horsfieldi, Ogilvie-Grant, Cat. Birds, B. M., xxii, p. 302 (1893); id. Hand-List, Game B., i, p. 269 (1895); Blanford, Fauna. Brit. Ind., iv, p. 92 (1898); Oates, Man. Game B., i, p. 334 (1898); id. Ibis (1903) p. 102; Oates, Cat. Eggs, B. M., i, p. 55 (1901); Stuart Baker, J. Bomb. Nat. Hist. Soc., xvii, p. 971 (1907); Ghigi, Mem. Acad. Bologna (6) v, p. 144 (1908); Harington, J. Bomb. Nat. Hist. Soc., xix, p. 309 (1909).

Description: adult male.—A black bird with the feathers of the lower back barred and edged with white. In a few individuals there are faint, yet quite distinct, signs of white fringes to the feathers of the mantle, and in others, though this is most unusual, there are indications of this fringe on the innermost tertiaries and their coverts. The width of the white fringes to the rump varies greatly in individuals from the same brood, as does the extent to which these bars extend up the lower back.

In young males of the second year, a certain amount of brown vermiculation is often found on the tail feathers, and on the outermost primaries. Generally also, the gloss on the plumage appears to

be more green, or even purple, in very old males, and more blue in the younger birds. Some young males of this and other species of the family retain a brown or rufous tint on the white portions of the feathers in their first spring moult (*vide* Oates' type specimen of *williamsi*).

Adult female.—The upper plumage varies from a pure olive brown to a rich chestnut brown, the feathers with pale edgings. In some cases these pale borders are very pronounced, and in a few they are a very pale buff or practically white on the scapulars, tertiaries, and greater wing coverts. Below, the breast varies from a dull grey brown, with paler and more grey margins to the feathers, to a rich bright rufous brown, with strongly marked paler borders.

The tails vary considerably; in some specimens the two central tail feathers, in others four, and in a few six, are chestnut or chestnut mottled with brown. A few specimens in the British Museum marked ♀, but in all probability really ♂, have the under plumage much darker, almost a blackish brown, with pronounced shaft stripes, which occasionally become V-shaped. The variations recorded do not depend in the least upon locality; birds both ♂ and ♀ from the one district, Balisera in Sylhet, show the greatest divergence, so great indeed that from this one small area, a cluster of tea gardens, Oates has named no less than four species, *i.e.*, *horsfieldi*, *obscurus*, *wickhami*, *prendergasti*.

Distribution.—The area shown as inhabited by this bird is coloured green in Map No. 1, and may, roughly speaking, be said to extend from the East of Bhutan down the Cachar, Sylhet, Chittagong and Arakan sub-maritime and lower hill regions as far South as Akyab. It then extends East through Assam, N. and S. of the Brahmapootra, as far as the 99° long., and is found in the larger river valleys, extending considerably South into areas, the higher parts of which are inhabited by other species or sub-species. Down the Manipur River, it has been obtained as far South as Falam, on the Chindwin down to its junction with the Yu River, and probably still further down stream. On the Irrawaddy typical specimens have certainly been got as far South as Sinkan below Bhamo, and there is also a doubtful record from Zowchaun.

It is probably found in the valleys of the Upper Chindwin and Oyu, as there is a specimen in the B. M. from Tazone to the N. of these valleys which Oates himself admits is a pure *horsfieldi*.

The following types and other specimens in the British Museum Collection ticketed under other names are all *horsfieldi*.

Gennæus mearsi.—Type of species ♂ No. 73, Oates' Coll. Nanywa. This is a young bird but is a quite typical *horsfieldi*; the alleged difference, the blue shown on the feathers of the rump, is one of age and condition only, and Oates' type of *mearsi* is exactly like specimen No. 89.5.13.580 of the B. M. Coll. from the Khasia Hills and other specimens from Bhutan.

♂ No. 22, Oates' Coll., Cachar. A quite typical *horsfieldi* from Cachar; the tail is a long one, and the central rectrices are slightly vermiculated, a not uncommon occurrence in young birds.

Gennæus batemani.

♂ Oates' Coll. No. 101, Myitkina, type.

♀ Oates' Coll. No. 91, Myitkina.

♂ 2, Oates' Coll. Nos. 36 and 110, Myitkina.

♂ No. 149 is also a true *horsfieldi*.

Gennæus prendergasti.

♂ Oates' Coll. No. 158, Paletwa, Arakan, type. A young but quite typical specimen of *horsfieldi*. The rump feathers in this specimen are fringed with rufous instead of white, but I have seen this same character in young birds throughout Assam.

♂ Nos. 75, 76, 77, Oates' Coll. Balisera, South Sylhet.

No. 166, Akyab, N.-W. Arakan.

Nos. 160-1, N.-W. Arakan.

Curiously enough, although Oates calls all these *prendergasti*, none of them have his alleged distinguishing characteristic of a rufous fringed rump.

Gennæus davisoni.

♂ Nos. 63 and 67, Oates Coll. Kamaing near Nanywa.

No. 96 has a tail longer than the average, but exactly equal to Oates' No. 22, which he calls *mearsi*, and I have myself shot birds with even longer tails in Cachar.

♀ No. 97, Oates' Coll. Sinkan, Bhamo. This is a typical young male *horsfieldi*.

Gennæus wickhami.

♂ No. 82, Oates' Coll., Balisera, South Sylhet.

♂ Nos. 81, 90; ♀ 84, 88, near Fort White.

♂ No. 28; ♀ No. 31, Cachar.

Gennæus obscurus.

♂ Nos. 64, 66, 68, 70, 74; ♀ 71, Oates' Coll., Kamaing.

♀ No. 72, Oates' Coll., Jade Mines (Kamaing).

All these are quite typical *horsfieldi*. The differences alleged by Oates to exist between the females of this species and *horsfieldi* are non-existent, and the type of his ♀ *obscurus* is, almost feather for feather, exactly the same as a female from Margherita in Assam. It is a common occurrence for the female of *horsfieldi* to have from 2 to 6 of the central rectrices rufescent.

Gennæus cliffordi.

♂ No. 146, Oates' Coll., Myitkina.

♀ Oates' Coll., type ♂ 1910.7.5.102(♀ 107). This appears to be a young male *horsfieldi*.

Gennæus lineatus.

♂ Mus. Coll., No. 80.1.1.3330, Arakan.

The following specimens, which have been accorded specific names, are all hybrids:—

Gennæus batemani = *horsfieldi* > *rufipes*.

♂ B. M., No. 1902.11.9.8. Shot by Captain Nisbett near Sadon. Almost a pure *horsfieldi*, but showing by the white stippling on the outer scapulars that it has a cross of *rufipes* in it.

♂ No. 103, Oates' Coll., Myitkina = $\frac{\text{williamsi}}{\text{horsfieldi}}$ > *rufipes*.

Gennæus wickhami = *horsfieldi* × *cuvieri*.

♂ Oates' Coll., No. 1910.7.5.74. Falam, near Fort White, *type*.

♂ Oates' Coll., No. 78, 15 miles N.-W. of Fort White.

Gennæus cliffordi = *horsfieldi* × *williamsi*.

♂ Oates' Coll., No. ? Myitkina.

Gennæus davisoni = *horsfieldi* × *williamsi*.

♂ B. M., No. 76.4.7.155 *type*.

In addition to the above, there are the below mentioned hybrids in the B. M. not named:—

= *horsfieldi* > *rufipes*.

No. 1902.11.9.8. Shot by Captain Nisbett near Sadon.

No. 1902.11.9.9. Do. do. do.

No. 1905.1.25.244. Do. do. do.

No. 1905.1.25.245. Do. do. do.

No. 1905.1.25.246. Do. do. Punkhan.

= *horsfieldi* × *rufipes*.

No. 1902.11.9.9. Shot by Captain Nisbett near Sadon.

No. 1905.1.25.247. Do. do. Punkhan.

Gennæus ommaneyi = *horsfieldi* > *rufipes*.

Oates' Coll., No. 102, Myitkina, near Sadon, killed by Captain Clifford in the same place as three other specimens said to be of this species.

No. 92, Oates' Coll., No. 1910.7.5.102.

No. 100, Oates' Coll., No. 1910.7.5.105.

No. 52, Oates' Coll. Shot by Major Evans.

All these birds shot in exactly the same place vary very considerably from one another, and all show distinctly that they are hybrids. At this point, Myitkina, where the habitats of *rufipes* and *horsfieldi* adjoin, the hybridization which occurs has some very startling results.

GENNÆUS HORSFIELDI CUVIERI.

Cuvier's Kalij Pheasant.

♂ Plate ii, No. 1.

Lophophorus cuvieri, Temm. Pl. Col., v, pl. 10 (1820).

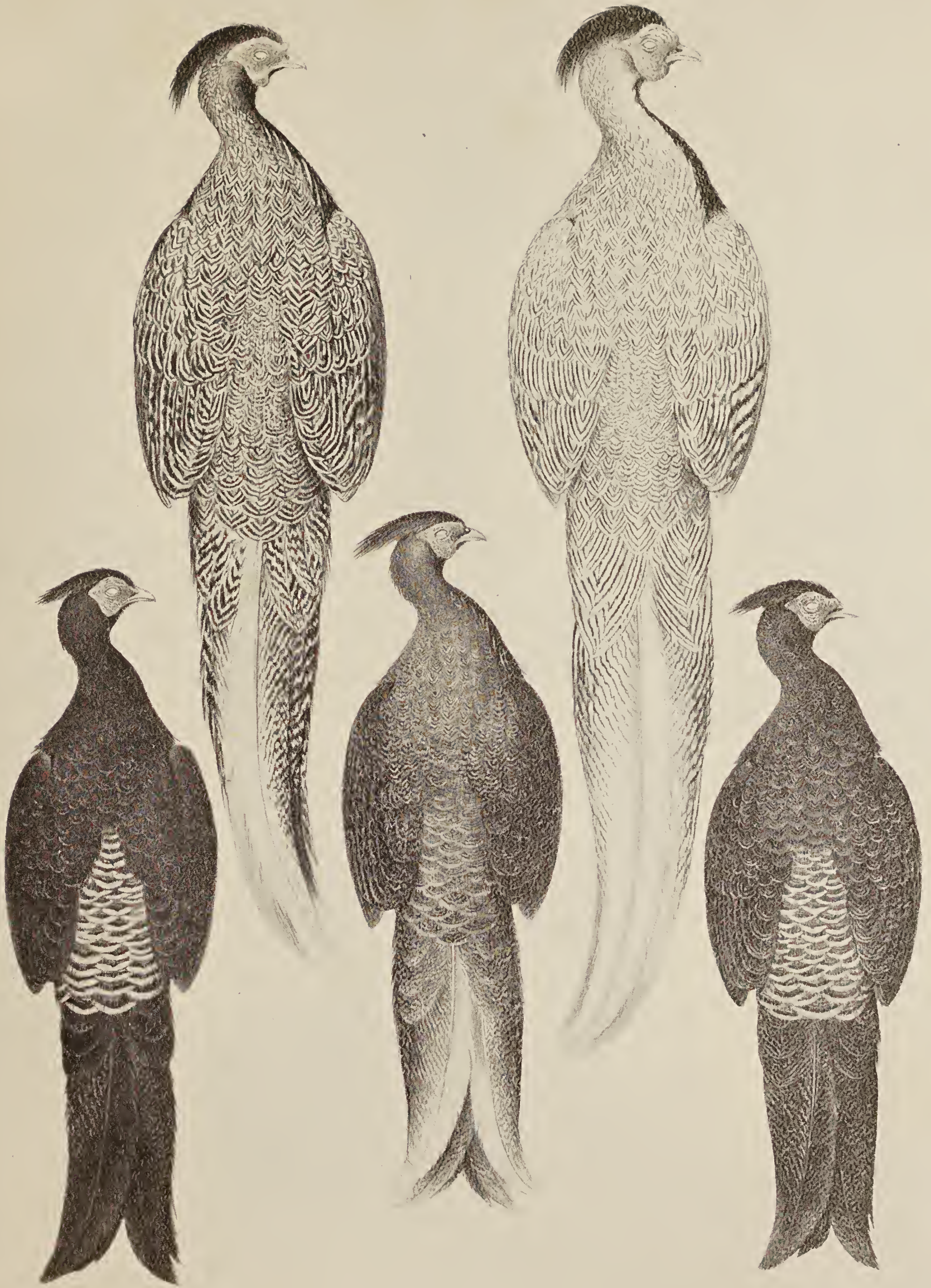
Euplocomus cuvieri, Sanderson, Str. Feath., viii, p. 493 (1879).

Euplocamus cuvieri, Hume and Marshall, Game B. Ind., i, p. 202 (1878); Oates, Str. Feath., iii, p. 343 (1875); Oates, B. Bumah, ii, p. 318 (1883) (part).

Euplocamus lineatus, Blyth, Cat. Mus. As. Soc., p. 244 (1849) (pa).

Gennæus obscurus.—Oates, Ann. Mag. Hist. (7) xiv, p. 283 (1904); Oates, J. B. N. H. S., xvi, p. 112 (1904); Ghigi, Mem. Acad. Bologna (6) v, p. 143 (1908).

Gennæus cuvieri.—Ogilvie-Grant, Cat. Birds, B. M., xxii, p. 303 (1893); id. Hand-List, Game B., i, p. 271 (1895); Blanford, Fauna Brit. Ind, iv, p. 93 (1898); Oates, Man. Game B., i, p. 345 (1898); Oates, Ibis (1903) p. 103; Ghigi, Men. Acad. Bologna (6) v, p. 142 (1908); Hopwood, J. Bomb. N. H. Soc., xxi, p. 1214 (1912).



H. Grönvold, del.

Cuvieri. Sharpei. Oatesi. Rufipes. Williamsi.

Type in Indian Museum, Calcutta, No.?

Description: adult male.—This bird differs from *horsfieldi* in having numerous small white bars to the back, scapulars and wing coverts, making the general appearance of these parts a very dark grey, rather than black as in that bird. At the same time, the contrast between the broad white bars of the rump and the rest of the upper plumage is very striking.

From *oatesi* it differs in having the white of the upper parts less prominent, it is in fact exactly intermediate between *horsfieldi* and *oatesi*, as the latter bird again is intermediate between *cuvieri* and *lineatus*.

Female.—Cannot be distinguished from that of *horsfieldi*.

Distribution.—*G. h. cuvieri* extends from a little North of Akyab in a narrow line along the lower hills of Northern Arakan up to near Falam and Fort White and West of the Manipur River about as far North as latitude 24.75° . On the East of the same River it runs North along the foot of the hills, past the South of the Logtak Lake and thence North-East to Tazone and East to Nanywa and Kamaing, and thence South again over a considerable tract of country as far South as the 24° latitude. It is with a great deal of hesitation that I have admitted this sub-species to its present rank, and it is evidently one which is still not far advanced in evolution, as throughout the area it inhabits, the number of specimens obtained which show unmistakeable signs of hybridization is very large. It is a sub-species forming the intermediate link between *h. horsfieldi* and three other sub-species. Thus, on the South-West it comes between that bird and *oatesi*, then on the West and North-West between *horsfieldi* and *williamsi*, and finally, on the North-East of its range between *horsfieldi* and *rufipes*. Throughout, however, this long, narrow stretch of country we get birds which show no signs of hybridization, and which agree perfectly with the type of bird described by Temminck, but the position of the country it inhabits, *i.e.*, low hills just above the usual habitat of *horsfieldi* and just below that of the other sub-species, is one into which incursions of other forms from above and below must be constantly occurring. We should, therefore, expect to find that even if the climatic conditions are such as to render some modification of colour probable, the confined width of country occupied would make hybridization with the adjoining forms very frequent.

The original type of *cuvieri* came from Arakan.

Oates' *obscurus*, type ♂, Oates' Coll., No. 1910. ♂ 7.5.102 appears to be nothing but *cuvieri*, and might well have been the original of Temminck's picture of this bird. The ♀ as already noted is a ♂ *horsfieldi*.

The following specimens in the British Museum have been wrongly named by Oates, and are really only *cuvieri*:—

Gennæus davisoni.

Nos. 32, Oates' Coll., Tawnglon, 20 South of Kawlin.

Gennæus obscurus.

♂ No. 1902.11.9.10. Wela, 14 miles North of Wunthu.

Gennæus prendergasti.

♂ B. M. No. 86, Oates' Coll., Tiddim.

Gennæus wickhami.

♂ ♂ Nos. 79 and 80, Oates' Coll., Fort White.

GENNÆUS HORSFIELDI WILLIAMSI.

Williams' Kalij Pheasant.

♂ Plate ii, No. 5.

Gennæus williamsi, Oates, Man. Game B., i, p. 342 (1898); Oates, Ibis (1903), p. 104; Oates, J. Bomb. N. H. Soc., xviii, p. 86 (1907); Ghigi, Mem. Acad. Bologna (6) v, p. 142 (1908).

Gennæus turneri, Finn, Jour. Asiat. Soc. Bengal, lxix, p. ii., p. 146 (1901).

Gennæus macdonaldi, Oates, Jour. Bomb. N. H. S., xvii, p. 10 (1906); Ghigi, Mem. Acad. Bologna (6) v, p. 142 (1908).

Gennæus ommaneyi, Oates. ? type in B. M.

Type ♂, B. Mus., No. 197.11.30.9, Kalewa.

Description: adult male.—Williams' Silver Pheasant is a sub-species intermediate between *cuvieri* on the North and West and *rufipes* on the East, and is an evolution on somewhat parallel lines with that of *oatesi* which comes between *cuvieri* and *lineatus* in the South and West. In the present sub-species, however, the black and white markings of the upper plumage are distinct bars and lines rather than vermiculations, though both bars and lines may be very fine. The general aspect of the upper plumage is a grey, the black and white markings being about equal in extent. The rump and upper tail coverts contrast quite strongly with the rest of the upper plumage, the feathers here being broadly fringed with white, preceded by one broad and one less broad band of white, the rest of the bars of the feather being vermiculated. Occasionally fine bars instead of broken vermiculations extend to the base of the feather. The variations are not due to age, as birds still retaining feathers of the first plumage have these parts finely vermiculated practically throughout, whilst others have them equally barred. The crest is black. The under parts are black, showing broad white lines or striae on the sides of the breast and flanks in varying degree.

The female cannot be invariably distinguished from that of *horsfieldi*, but is on an average paler and more rufous, more especially on the rectrices.

Distribution.—Williams' Silver Pheasant has a very well-defined range, being confined to the moderately high hills lying between the Manipur, Yaw, Oyu and Irrawaddy Rivers, and occurring, as a straggler only, as far South as latitude 21° in the Minbu District and as far North as Homalin and Tammu. It appears to be most abundant between latitudes 22° and 24° and longitudes 94° and 96° , though it also occurs in some numbers about the lower hills round Fort White. Normally it is not a bird of very high elevations, and it is exceptional to find it above 4,000, its principal haunts being from 2,000 to 3,000 feet.

The following so-called species have been so named on incorrect or insufficient ground, and must be considered synonyms of *williamsi*.

Gennæus macdonaldi=*williamsi*.

Type No. 123, Oates' Coll. B. M., 10.24.17.1910, described by Oates, B. N. H. Journal, vol. xvii, p. 10; shot by P. Wickham on Mount Victoria at 6,000 feet.

Although found at an unusual altitude for this sub-species, this particular specimen agrees with birds which Oates himself calls *williamsi* from Pakokku and the Lower Chindwin obtained at 2,000 feet and under. Oates' type is an exceptionally fine old bird, with enormous spurs, and the inner webs of the primaries white without mottling. This however is only a sign of full maturity, and is found similarly in specimens of *williamsi*, *cuvieri* and *horsfieldi* of equal age.

Oates' type is exactly matched by a bird which Oates himself calls *ommaneyi* from Kyouk Myoung, B. M. Coll., No. 1913.5.9.1.

Gennæus ommaneyi=*williamsi*.

Type B. M. Coll., 1910.10.24.16, Loungshe, Pakokku.

This bird was obtained in the extreme South of the range occupied by *williamsi*, and somewhat approaches *oatesi* in having the markings on the upper back very fine and narrow. It might possibly be considered by some a hybrid between these two sub-species, but taking into consideration the great variation in the width of the marking on the upper plumage of *williamsi*, I prefer to keep it as a synonym of this bird. It is well matched by other specimens from Monywa and Kalewa in the centre of the area inhabited by this Pheasant.

♂ B. M. Coll., No. 1913.5.9.1.

GENNÆUS LINEATUS.

The Burmese Silver Pheasant.

♂ Plate i, fig. 2; ♀ Plate iii, fig. 2.

Phasianus lineatus, Vigors, Phil. Mag. (1831), p. 147.

Gennæus lineatus, Oates, Str. Feath., v, p. 164 (1877); Ogilvie-Grant, Cat. Birds, B. M., xxii, p. 304 (1893); id. Hand-List, Game B., i, p. 272 (1895); Blanford, Fauna Brit. Ind., iv, p. 92 (1898); Oates, Man. Game B., i, p. 351 (1898); Oates, Ibis (1903), p. 100; id. Cat. Eggs, B. M., i, p. 55, pl. vi, fig. 5 (1901); Ghigi Mem. Acad. Bologna (6) v, p. 140 (1908).

Phasianus fasciatus, McClell., Calcutta Jour., N. H., ii, p. 146, pl. iii (1842).

Gallophasis lineatus, Hume, Str. Feath., ii, p. 482 (1874).

Euplocomus lineatus, Blyth, Cat. Mus. As. Soc., p. 244 (1849) (part).

Euplocamus lineatus, Hume, Nests and Eggs, Ind. B., p. 525 (1873); Hume, Str. Feath., iii, p. 165 (1875); Fielden, Str. Feath., iii, p. 168 (1875); Hume and Marshall, Game Birds Ind., p. 205, pl. (1878); Hume and Davison, Str. Feath., vi, p. 436 (1878); Anderson, Zool. W. Yunnan, ii, p. 669 (1878); Bingham, Str. Feath., ix, p. 195 (1880); Oates, Str. Feath., x, p. 236 (1882); Oates, Birds, Burmah, ii, p. 316 (1883); Oates, ed. Hume, Nests and Eggs, iii, p. 416 (1890).

Lophophorus cuvieri, Hume, Str. Feath., iii, p. 166 (1875).

Nythemerus lineatus, Blyth and Walden, Cat. Mammals and Birds, Burmah, p. 149 (1895).

Euplocamus cuvieri, Oates, B. Burmah, ii, p. 318 (1883) (part).

Type?

Description: adult male.—The whole upper plumage, with the exception of a black crest, very finely vermiculated with black and white. In some birds these vermiculations are somewhat bolder and better defined than in others, but in no case do they develop into regular bars. Below the whole plumage is black with long white streaks to the feathers, widest and best defined on the flanks and sides of breast. The outer webs of the central rectrices are more or less white.

The rump is marked like the rest of the upper plumage, and *does not* contrast with it.

Adult female.—Above light olive rufous, with white and V-shaped centres to the feathers of the nape and mantle, and everywhere faintly stippled with brown; below bright rufous chestnut with broad white centres to the feathers.

The tail is pale rufescent, more or less stippled and barred with black on the outer webs of the feathers; the outer tail feathers are generally a rather rich dark chestnut barred with white, the white bars margined above and below with blackish. Sometimes the chestnut is pale and yellowish, and the richness in colour generally varies greatly individually.

Distribution.—The Burmese Silver Pheasant is found throughout the Pegu Yomas between the Irrawaddy and the Sittang, and across the extreme South of the latter River, East into the Moulmein District, as far South as Moulmein and Muleyit Mountain. Northwards it is found at least as far as the Thazi-Taungyi Road and from Fort Stedman it appears to extend in a narrow line as far East as the neighbourhood of Kengtung. It has not however been procured between Fort Stedman and Kengtung, and its appearance

at this latter place may prove to be abnormal. It appears to be found up to and sometimes above 5,000 feet, but its usual habitat would appear to be somewhere between 2,500 and 4,000 feet.

There is a specimen in the British Museum received from the Hon. the East India Company's Collection, labelled "Bhutan Himalayas" ♂ No. 44.9.4.3. This of course is an incorrectly given locality.

The following birds also appear to be wrongly labelled :—

♂ No. 67.6.13.2, Arakan, Zoological Society's Coll.

♂ No. 67.12.12.1, no data, probably same as above.

GENNÆUS LINEATUS OATESI.

The Arakan Silver Pheasant.

♂ Plate i, fig. 3.

Gennæus oatesi, Ogilvie-Grant, Cat. Birds, B. M., xxii, p. 306 (1893) ; id. Hand-List, Game B., i, p. 277 (1895).

Gennæus oatesi, Oates, Man., Game B., i, p. 348 (1898) ; Oates, Ibis (1903) p. 103 ; Ghigi, Mem. Acad. Bologna (6) v, p. 141 (1908).

Types ♂ B. M. Coll. 82.1.20.70, Arakan lat. 19, January 1872, and ♀ B. M. Coll. 1.1.35.79, Arakan, 1880.

Description: adult male.—Intermediate between *Gennæus horsfieldi* *cuvieri* and *Gennæus lineatus lineatus*, nearer perhaps to the latter than the former. The markings on the upper plumage are very fine and give the same unicolored appearance as is seen in true *lineatus* at a distance, but when seen close by, the vermiculations are found to be bolder and more defined. There is still sufficient indication of the barring on the rump to make this part of the upper plumage contrast with the rest, and in one specimen from Thazi-Taungyi the barring is quite strongly developed. The flanks and sides of the breast and lower neck have broad white shaft lines, and the central rectrices are broadly white on the outer web.

The female.—Differs from that of *horsfieldi* and *cuvieri* in having the whole tail above and below irregularly barred with pale dull rufous. Of the three specimens in the B. M. Coll., two have the rectrices a dull pale chestnut brown, and the third has them a chestnut rufous. In each case the central rectrices are somewhat paler and more rufous than the rest, but not sufficiently so to cause a contrast as occurs in *horsfieldi* in similar cases. The type female has no pale striæ on the upper parts, but is redder than most female *horsfieldi*, the others have these tiny central striæ to the feathers, but are otherwise more like normal females of that bird. All have pale central striæ to the feathers of the neck, breast and upper flanks, similar to, though less pronounced than in the females of *lineatus*.

Distribution.—Oates' Silver Pheasant inhabits an area of low hills in Arakan from the sea coast to the Irrawaddy River as far North as Minbu, but does not apparently ascend the hills to any great elevation, and though stragglers may be found up to 5,000 feet, it keeps normally to between 1,000 and 3,000 feet. In the extreme South of Arakan it is very rare, and does not come down near the sea coast except when the hills also come right down to this. There are very few skins of this sub-species in collections, and it is therefore difficult to define its area. In the dry zone of Arakan there are no Pheasants, and this may, with some differences which exist in the country North and South of Minbu, account for the constant difference in type between *williamsi* and *oatesi*.

The only five specimens named *oatesi* in the British Museum Collection are all from the area restricted to this sub-species, and are all correctly named.

GENNÆUS LINEATUS SHARPEI.

Grant's Silver Pheasant.

♀ Plate iii, No. 3.

Gennæus sharpei.—Oates, Man. Game B., i, p. 357 (1898); Oates, Ibis (1903) p. 101; Ghigi, Mem. Acad. Bologna (6) v, p. 140 (1908).

Type ♂, B. Mus., No. 189.5.10.1703, Dargwin.

Description: adult male.—This sub-species is nearer to *lineatus* than to any other, but it is also the first of the Northern forms to show the transformation of the vermiculations into bold lines of black and white, quite different in character from the duller toned barring of the Western forms. The whole upper plumage is barred, or perhaps one should say lined, throughout with black and white, the lines much about the same in width, but the black, if anything, predominating, some birds looking very dark. The black under parts are very freely marked with white in bold longitudinal streaks on breast and flanks, especially on the sides of the upper breast, far more so even than any of the whiter forms in the North, and showing a distinct approach to the Annam birds which again run into the Hainan *whiteheadi* which has the feathers here pure white.

Adult female.—Similar to that of *lineatus* but at once easily distinguished by having the lower parts a smoky blackish brown instead of bright chestnut brown; the feathers are however streaked with white throughout as in that species.

The tail is more like that of the female of *rufipes*, with very bold, richly marked outer tail feathers, though the central rectrices are like those of *lineatus*.

The only three specimens of females in the British Museum Collection were all collected on Muleyit Mountain, whence no male bird had yet been obtained, and I was extremely doubtful as to accepting them as proved females of the male bird which Oates called *sharpei*. I have now, however, a pair of birds which I owe to Mr. J. P. Cook, shot together, so that I have no longer any hesitation in giving *sharpei* sub-specific rank. Except for the bold white marking on the flanks, the male *sharpei* is very like the darkest specimens of *rufipes* which Oates named *atlayi*, but it is darker still than these birds with narrower bars on the upper plumage and wings.

Distribution.—The type was obtained from Dargwin at an elevation of some 2,500 feet, and it has also been procured at Thandoung and Papun. The three females were taken in Muleyit about 3,500 feet, and the pair of birds sent me were shot near Rahang, N.-E. of Muleyit.

Its range is probably the Salwin Valley from about the 17° of latitude as far North as Karennee, and it will also probably be found to extend West and East to the Sittang and Me Wung Rivers, respectively, in so far as the country suits it. Its stronghold, however, will probably be found to be the higher ranges of the Bree Country in the North and Muleyit in the South.

It is difficult to advance any theory as to why the duller vermiculated upper surface of the plumage of the Western forms should here be in gradual course of transformation to bolder lines of black and white, but it is possible that such a colouration is more protective in open sunlit country than it would be in the soft grey shades of thin forest.

GENNÆUS NYCTHEMERUS.

The Chinese Silver Pheasant.

♂ Plate i, fig. 3; ♀ Plate iii, fig. 6.

Phasianus nycthemerus.—Linn, S. N., i, p. 272 (1768); Lath, Ind. Orn., ii, p. 631 (1790).

Euplocamus nycthemerus.—J. E. Gray, Ill. Ind. Zool., ii, pl. 38, fig. 2 (1834); Blyth, Cat. Mus. As. Soc., p. 244 (1849).

Euplocamus nycthemerus.—Gould, B. Asia, vii, p. 17 (1859).

Gennæus nycthemerus.—Ogilvie-Grant, Cat. Birds, B. M., xxii, p. 307 (1893); id. Hand-List, Game B., i, p. 277 (1895); Oates, Cat. Eggs, B. M., i, p. 55 (1901); Ghigi, Mem. Acad. Bologna (6) v, p. 138 (1908); Ingram, Nov. Zool., xix, p. 270 (1912).

Type ?

Description: adult male.—The upper plumage white with narrow longitudinal lines of black, finest and very often broken on the neck and back, and broadest, though still much narrower than the white, on the wings and outer tail coverts and tail feathers; two, and

sometimes four, central tail feathers pure white and greatly lengthened; sides of neck pure white, the frecklings often absent even on the nape just behind the crest. Below black, the feathers of the sides of the breast barred, or lined, black and white.

The number of bars and even their alignment varies in almost every individual, and this species shows well how utterly useless was Oates' attempt to divide species of Silver Pheasants according to the number and alignment of the markings on the wing feathers.

Adult female.—Upper parts olive brown with the crest somewhat darker. While lower surface varying between olive grey-brown to pure grey-brown, the greater part of abdomen and flanks and under tail coverts powdered with minute white specks, rather larger and more definite on the under tail coverts than elsewhere.

Tail very long as in *ripponi*. Legs red.

Distribution.—"South China, Fokien, Chinkiang" (Grant). The Chinese Silver Pheasant appears to be found from latitude 28° to about latitude 22° on the Western watershed of the Salwin, but not in the lower lying country adjoining the river between 22° and 24° .

GENNÆUS NYCTHEMERUS RUFIPES.

The Ruby Mines Silver Pheasant.

♂ Plate ii, fig. 4; ♀ Plate iii, fig. 4.

Gennæus rufipes, Oates, Man. Game B., i, p. 362 (1898); Oates, Ibis (1903) p. 97; Ghigi, Mem. Acad. Bologna (6) v, p. 139 (1908).

Gennæus atlayi, Oates, Ann. and Mag. Nat. Hist. (8) v, p. 162 (1910).

Gennæus granti, Oates, Ann. and Mag. Nat. Hist. (8) v, p. 163 (1910).

Gennæus assimilis, Oates, Journ. Bomb. N. H. Soc., xvi, p. 114 (1904); Oates, Ann. and Mag. Nat. Hist. (7) xiv, p. 286 (1904); Ghigi, Mem. Acad. Bologna (6) v, p. 141 (1908).

Gennæus elegans.

Gennæus affinis, Oates, Ann. and Mag. Nat. Hist. (7) xi, p. 231 (1903); Ghigi, Mem. Acad. Bologna (6) v, p. 143 (1908).

Type ♂, B. Mus., No. 96.1.15.1, Mogok, near Ruby Mines.

Description: adult male.—Whole upper plumage barred black and white, the latter greatly preponderating, so that the general impression given by the bird at a distance is that it is nearly white above and black below. Legs red.

Female.—General colour above rich olive brown, crest darker and tail very richly barred and mottled with deep chestnut and blackish brown, the outer tail feathers darker than the central ones. Under



1



2



3



4



5



6

Feathers from the breasts of females of

1. *Gennens horsfieldi*.

2. *G. lineatus*.

3. *G. sharpei*.

4. *G. nycthemerus rufipes*.

5. *G. swinhoei*.

6. *G. n. nycthemerus*.

parts rich blackish brown, the feathers marked with bold concentric bars of rich fulvous, not with longitudinal striæ as in *lineatus*. Legs red.

Distribution.—The area inhabited by this sub-species may be said to be the inter Irrawaddy-Salwin District from about 26.50° latitude N. to about 21.50° or rather further South.

It will be seen that the area occupied by this sub-species is very much greater than that inhabited by any other, but, at the same time, it is a well-defined area between two big rivers, the Irrawaddy and the Salwin, on the West and East; whilst on the South it is to a great extent divided from *sharpei* by the dry area from Mandalay and Maymyo on the North to Meiktila and Taungyi on the South, in which Silver Pheasants appear to be very rare.

The extent to which *rufipes* must be held to absorb other species named by Oates and others is a question which has given me infinitely more need for thought than the consideration of the whole of the other forms put together. In the area which I now claim holds but one good and one doubtful sub-species, Oates and others have named the following thirteen species:—*G. rufipes*, *jonesi*, *ripponi*, *atlayi*, *assimilis*, *elegans*, *granti*, *affinis*, *haringtoni*, *andersoni*, *nisbetti*, *crawfurdi* and *nycthemerus*.

At first sight, this would seem to show that I must be wrong in admitting but two sub-species, but a careful analysis of the position will possibly prove my contention to be right. In the first place a glance of the Map No. 2 will show that throughout the wide area over which this bird, *rufipes*, is distributed, there is no very large river to check distribution, and with the other sub-species we find that, almost invariably, rivers form the boundaries which divide one from another. It is true that along the valleys of some of these boundary rivers another species, *horsfieldi*, is to be found at the lowest altitudes, but still we have a definite boundary to the hills which prevents access, except in exceptional cases, from one area to another. But in the area occupied by *rufipes*, there is no crossing of such boundary, and therefore there is only one other cause which would check the spread of a species, or sub-species, *viz.*, a sudden alteration in the elevation of the country and a corresponding change in climate and vegetation. There is, however, no change of this character in elevation, and the bird spreads accordingly. At the same time, the South centre of the area marked on the map as being the habitat of this bird is much drier and lower, and here, accordingly, the bird has not yet been obtained.

An examination of all the material obtainable proves that even in the area occupied by *rufipes*, the same laws that have in other parts of Burmah evolved species and sub-species are in force here also, in consequence of which we find that, *on an average*, the whitest birds are to be found on the highest, most open plateaux and

mountains on the extreme North-East and East, and the darkest on the more heavily forested, damper and lower mountains on the South-West.

The variation in elevation and climate is, however, not nearly so great between these two extremes as it is in most parts of this country, so the parallel differences in plumage are also less well-defined. Again, when one sorts out specimens according to locality, it is found to be impossible to define to which sub-species any one locality shall be allotted, and the more specimens one obtains, the more difficult is it to name them.

For instance, there is the Ruby Mines District from which we have no less than six so-called species, *i.e.*, *rufipes*, *atlayi*, *assimilis*, *elegans*, *haringtoni* and *nisbetti*. Again, we can narrow down some of these species in many cases to yet smaller areas. Thus, *rufipes* and *atlayi*, both specimens named by Oates himself, were shot by Captain Atlay on the same day at the same place, fifteen miles East of Mogok. From Mogok itself we have specimens of *rufipes*, *atlayi*, *elegans*, and *assimilis*, the same from Kyatpin and other places.

Oates has laid considerable stress on the fact that some of his species have red and some of them yellowish horn, or dull greenish horn coloured legs.

It is necessary, therefore, to examine this point carefully. Our four admitted species which bound this area have their legs coloured, thus : *horsfieldi*, dark coloured legs with no tinge of red, a colour which is retained in the legs of its sub-species *williamsi* and *cuvieri*. *Lineatus* also has dark legs, as has its sub-species *oatesi*, but when we examine the sub-species *lineatus sharpei*, we find that though it has not red legs its legs are described by field naturalists as yellowish horn or light horn. Thus it would appear as if some climatic influence were already at work turning the colour of the legs to a lighter and brighter hue. The two species *whiteheadi* and *nycthemerus* both have brilliant red legs, and, as we should expect, the sub-species nearest to them, *rufipes*, *beli* and *annamensis* have also red legs.

Why then should *elegans* and *massimilis* have yellow legs? The reason I believe is merely this, that the colour is due to a throw back to the original type *horsfieldi*, or is due to direct hybridization with this bird, although the cross may not be a recent one or apparent in other ways.

Of *atlayi* there are six specimens in the British Museum Collection, all of which have yellow legs and four of which are in general colouration very dark birds. All these specimens of *atlayi* are from Mogok and Khaben, the most Western portion of the range of *rufipes*, and nearest to, and therefore most liable to hybridization with, *horsfieldi williamsi*. Moreover, Mogok is close to the valley

of the Irrawaddy, and it is quite possible that the cross may have even been with a specimen of *horsfieldi* itself.

As regards *elegans*, of the eight specimens in the Museum Collections, seven were collected in the Ruby Mines District, and one at Loimai in the Southern Shan States. In these cases the yellow legs are due to the causes already mentioned with the exception that in the case of the Loimai bird the throw back would be to *lineatus* or the cross, if due to hybridization, with the same bird.

It appears to me that Oates found within the Ruby Mines District a form of Silver Pheasant which varied very greatly in depth of colouring, birds from the same locality and sometimes from the same flock showing the extremes of variation met with. Then at the same time and from the same locality he got dark birds with red legs and pale birds with red legs, and also both forms with yellow legs. He accordingly divided the red legs from the yellow legs, and these two divisions again into dark and light birds, after which he gave them four names.

The darker red-legged birds he called *atlayi* and the paler *rufipes*, whilst of the yellow-legged birds he called the paler *elegans*, and two somewhat darker specimens *assimilis*.

A bird with one yellow and one red leg he has called *rufipes*.

It is quite incredible that four sub-species can exist in the same area at the same elevation, and I have no alternative but to reduce *assimilis*, *elegans* and *atlayi* to synonyms of *rufipes*.

Before leaving this question of variation and hybridization, it may be well to quote the remarks made by Major Nisbett in a letter to Major Harington:

“This bird was shot at a spot near Sadon, where the two streams meet before flowing down to the Irrawaddy, and where I can conscientiously say I never got two birds alike.”

Of the remaining so-called species, *haringtoni*, *nisbeti*, *andersoni*, *crawfurdi* and *granti*, all bear distinct signs of hybridization. *Haringtoni* and *andersoni* are exactly like one another, and both show in the unequal marking on the upper plumage that they are the result of hybridization. *Crawfurdi* is merely a synonym of *andersoni*, and *granti*, though a paler bird than *haringtoni*, shows very similar marks of the *horsfieldi* cross.

The following specimens are all *Gennæus nycthemerus rufipes*:—

Gennæus atladi.

1. B. M., No. 1910.7.5.17, Ruby Mines; type of species.
2. „ „ 1910.7.5.20, 15 M. E. of Mogok. Shot together with *rufipes*, No. 1910.7.5.5.
3. „ „ 1910.7.5.18, Ruby Mines.
4. „ „ 1910.7.5.19 „ „
5. } „ „ 1910.7.5.21-22, Khaben, Ruby Mines.
6. }

Gennæus elegans.

1. B. M., No. 1910.7.5.30, Taung-ping, Ruby Mines; type of species.
2. } " " " 7.5.34-5, Kyatpin, Ruby Mines.
3. }
4. } " " " 7.5.31-2, Ruby Mines.
5. }
6. " " " 7.5.33, Mogok.
7. " " 1903.7.24.2 "
8. " " 1900.12.20.940, Below Loimai, S. Shan.

Gennæus assimilis.

1. } B. M., No. 1910.7.5.24-5, Ruby Mines; type of species.
2. }

The following specimens are all hybrids:—

Gennæus haringtoni = *G. nycthemerus rufipes* > *horsfieldi*. Type.

Gennæus andersoni = *G. n. rufipes* > *horsfieldi*.

This bird is exactly the same as the specimens called *haringtoni* by Oates.
(Type in Indian Museum, Calcutta.)

Gennæus granti = *G. n. rufipes* > *horsfieldi*.

Types { ♂ Nisbett's No. 8 in Oates' Collection.
 ♀ " " 2 " " " " " " " " " " " "

Both these birds were shot by Nisbett at Puntun, S.-E. of Sadon. They are the birds mentioned by Oates as being his types of the species, although he has not noted this on the labels.

All three of these so-called species, *haringtoni*, *andersoni*, and *granti* are hybrids between *rufipes* and *horsfieldi*; they vary somewhat *inter se*, but the *nycthemerus* cross is the dominating one, especially in *granti*. Hybridization is shown distinctly by the patchy colouration, and it is most interesting to note that in all these hybrids the barring of the rump in contrast to the rest of the upper plumage is distinct, though faint. In fact here in the extreme North-East of the Silver Pheasant's habitat hybridization has evolved a specimen very much like a pale *cuvieri* or dark *oatesi* in the West.

All these hybrids are red-legged birds.

Gennæus nisbeti = *G. n. rufipes* > *horsfieldi*.

Type Oates' Coll., No. 99.

This species is named from the remnants of a skin only, and it is not easy to say whether it is a specimen of *rufipes* pure and simple, or a hybrid, but traces of unevenness in the marking incline me to the latter opinion.

Gennæus lineatus, Museum No. 1900.12.12.946, shot on the Eastern frontier of Bhamo, is a hybrid between *nycthemerus rufipes* > *horsfieldi*.

GENNÆUS NYCTHEMERUS RIPPOI.

The Yunnan Silver Pheasant.

Gennæus ripponi, Sharpe, Bull. B. O. C., xiii, p. 29 (1902); Ghigi, Mem. Acad. Bologna (6) v, p. 139 (1908).

Gennæus jonesi, Oates, Ibis (1903) p. 97; Ghigi, Mem. Acad. Bologna (6) v, p. 139 (1908).

Description: adult male.—Differs from *nycthemerus rufipes* in being still whiter above with finer and fewer lines of black, in having the whole of the sides of the neck pure white rather than white finely vermiculated with black, and in having generally a longer tail.

Adult female.—Appears to be like that of *nycthemerus* rather than that of *rufipes*, though birds on the West and South-West of the inter Salwin-Mekong District somewhat approach the latter bird. The tail of the female is longer on an average than that of *rufipes*.

Distribution.—The district lying between the Salwin and Mekong Rivers as far South as the 20° latitude, where it meets *sharpei*.

It is only after long consideration, and, even then, with some hesitation that I accept this form as a sub-species.

The type of *ripponi* was a bird sent by Oates to Sharpe, who separated it from other forms under this name, and then returned the skin to Oates who, unaware that Sharpe had named it, again separated it as *jonesi*, so that the one skin is the type for the two species.

There is no doubt that if we make two geographical groups of the Silver Pheasants inhabiting the Irrawaddy-Salwin and the Salwin-Mekong Districts, it is easy to say that the one group differs from the other *on an average* in the respects already mentioned, but at the same time, it is equally undoubted that from the second named group one can easily pick out individuals matching *rufipes* on the one side, and again *nycthemerus* on the other. Thus a specimen—B. M., No. 97.9.2.1 — shot 20 miles East of Keng-tung is exactly like a specimen of true *nycthemerus* shot at Fokhien. I do not think that *nycthemerus rufipes* and *n. ripponi* are the same, but I feel doubtful if I am justified in dividing *ripponi* from *nycthemerus* itself.

There are nine specimens of *ripponi* in the British Museum Collection and a good series of *nycthemerus* from China and, as the average of the nine specimens of the former bear out Sharpe's diagnosis as a whole, I retain *ripponi* for the present, but if more material shows that the affinity to true *nycthemerus* is closer still, then *ripponi* must become a synonym of that bird.

The whole of the British Museum specimens, with one exception from Yunnan, have been obtained from the Southern Shan States, from Keng-tung to Moukmai, but I have seen one other specimen from the Northern Shan States and another from Yunnan which both are referable to this sub-species.

Although the range of this bird appears to run into that of *sharpei*, I have seen no specimens which appear to approach *sharpei* more closely than *rufipes* or *nycthemerus*. This may be due to *sharpei* keeping to lower levels than *ripponi*, but it certainly lends some strength to the contention that *ripponi* is entitled to rank as a sub-species.

GENNÆUS NYCTHEMERUS BELI.

Oustalet's Silver Pheasant.

Gennæus beli, Oustalet, Bull. M. Hist. Nat. Paris, iv, pp. 258-261 (1898); Ghigi, Mem. Acad. Bologna (6) v, p. 140 (1908).

Types in Paris Museum brought from Annam by Monsieur Bel.

Description: adult male.—Very similar to *sharpei*, but perhaps somewhat more boldly marked and with the black rather more pronounced on the wing feathers in comparison with the upper plumage. It differs principally from *sharpei* in having far more white on the feathers of the sides of the breast under the shoulders of the wing (carpal joint), in this respect showing its affinity to *G. whiteheadi whiteheadi*. The black lines on the wing are very broad and prominent.

Adult female.—Above, olive brown, practically without vermiculations and with no white markings. Tail rufous, inclining to chestnut on the outer feathers and vermiculated with narrow bars of dark brown. Below, paler olive brown with pale shafts and more rufescent under tail coverts.

Distribution.—Annam. The only specimen in the Museum is one of some birds reared in the Menagerie of the Paris Museum, the types having been brought from Annam by Monsieur Bel.

Much more material is necessary before it is possible to say whether *beli* and *annamensis* are separate from one another.

GENNÆUS NYCTHEMERUS ANNAMENSIS.

The Annam Silver Pheasant.

Gennæus annamensis, Ogilvie-Grant, Bull. B. O. C., xix, p. 13 (1906) (Bali, Annam); Ghigi, Mem. Acad. Bologna (6) v, p. 139 (1908).

Description: adult male.—Differs from *beli* in the same way that *sharpei* differs from *rufipes* in being an altogether darker bird with narrow white and broader black bands, this being especially noticeable on the wings and tail.

Female.—Like that of *beli*.

Distribution.—Annam "Hills behind Mhartrang" (Dr. J. J. Vassal).

GENNÆUS WHITEHEADI.

Whitehead's Silver Pheasant.

Gennæus whiteheadi, Ogilvie-Grant, Ibis (1899), p. 586 (Hainan); Ghigi, Mem. Acad. Bologna (6) v, p. 138 (1908).

Types in British Museum.

Description: adult male.—Crest and whole lower parts black. Sides of neck and shoulders white, the feathers with a narrow line running round the feather, following its contour about 5mm. from the edge; this line gets broader as it gets lower down the back, whilst in the wings the feathers are finely edged with black, and have the next black band as much as 8mm. wide. Central tail

feathers white, the next pair, or two pairs, white on the outer web and barred with wide semi-longitudinal bands of black about 12mm. broad.

Adult female.—Above, bright rufous brown, blackish brown on the shoulders where the feathers are broadly centred with white; elsewhere finely vermiculated with dark brown; tail rather more chestnut, especially on outer feathers. Below, nearly white, each feather broadly margined with blackish brown; chin and throat dirty white, and centre of abdomen and vent dull grey, showing only faint signs of dark edgings.

Distribution.—Hainan.

GENNÆUS SWINHOII.

Gould's Silver Pheasant.

Euplocamus swinhoii, Gould, P. Z. S. (1862), p. 284; Swinhoe, Ibis (1863), p. 401; Gould, B. Asia, vii, p. 16 (1864); Swinhoe, Ibis (1865), pp. 353, 538; (1866) pp. 133, 308, 404; (1867) pp. 232, 409; P. Z. S. (1871), p. 399; Elliott, Monog. Phasian., ii, p. 25 (1875).

Gennæus swinhoii.—Ogilvie-Grant, Cat. Birds, B. M., xxii, p. 309 (1893); id. Hand-List, Game B., i, p. 278 (1895); Oates, Cat. Eggs, B. M., i, p. 56 (1901).

Description: adult male.—Head, with exception of short crest, neck and under parts with all but central rectrices black; short crest, back of lower neck, upper back and central tail feathers white; lower back and upper tail coverts black; fringed with brilliant deep blue glass; scapulars purple bronze; wings black, the coverts egged with metallic green.

Adult female.—A rich rufous brown above, finely barred with black and feathers of mantle with broad rufous centres bordered and barred with black; central tail feathers the same as the back with narrow bands of whitish and black. Below, chin, throat, and sides of head and neck pale dull cinereous with still paler shaft stripes; remainder of lower plumage rich fulvous brown, almost chestnut on breast, the feathers margined and marked with lines of black.

Distribution.—Formosa.

GENNÆUS EDWARDSI.

Edward's Silver Pheasant.

Gennæus edwardsi, Oustalet, Bull. Mus., Paris, ii, pp. 316-317 (1896).

Type in Paris Museum.

Description: adult male.—"Piles crista decumbente alba, vix nigro maculata ornato, dorno, pectore, abdomineque splendide nigro

cœruleis, tergi plumis caudaque tectricibus limbo nigro decoratis, alarum tectricibus æno-viridi colore nitentibus, limbo nigro ante apicem ornatis, cauda nigrante, fere pluma, pennis gradatis, capitis lateribus nudis, rubris, paulo carunculatis, rostro corneo, basi nigra, pedibus rubris." (Oustalet.)

I have not been able to examine this bird, the only existing specimens of which are two adults, one young male, and some fragments which are in the Paris Museum. Judging however from the description of its white crest and blue-black back, etc., it is an entirely different species to any other.

Distribution.—Kuang-tri, Annam.

The following is the synonymy of the various hybrids which have been described as species:—

GENNÆUS WICKHAMI.

Gennæus wickhami, Oates, Man. Game B., ii, p. 495 (1899); Oates, Ibis (1903), p. 102; Ghigi, Men. Acad. Bologna (6) v, p. 142 (1908).

GENNÆUS CLIFFORDI.

Gennæus cliffordi, Oates, Ann. Mag. Nat. Hist. (7) xiv, p. 284 (1904); Oates, Journ. B. N. H. Soc., xvi, p. 113 (1904); Ghigi, Mem. Acad. Bologna (6) v, p. 144 (1908).

GENNÆUS DAVISONI.

Gennæus davisoni, Ogilvie-Grant, Cat. Birds, B. M., xxii, p. 304 (1893); id. Hand-List, Game B., i, p. 271 (1895).

Finn, J. As. Soc. Beng. (2) lxix, pp. 145-146 (1900); Oates, Ibis (1903), p. 105; Ghigi, Mem. Acad. Bologna (6) v, p. 142 (1908).

GENNÆUS HARINGTONI.

Gennæus haringtoni, Oates, Ann. and Mag. Nat. Hist. (8), v, p. 162 (1910); Harington, J. Bomb. N. H. Soc., xx, p. 377 (1910).

GENNÆUS ANDERSONI.

Eulocamus andersoni, Elliot, P. Z. S. (1871), p. 137; Anderson, Birds, Yunnan, p. 670, pl. iii (1878); Hume and Davison, Str. Feath., vi, p. 437 (1878); Hume and Marshall, Game Birds, Ind., i, pl. (1878); Anderson, Zool. W. Yunnan, ii, p. 678, pl. liii (1878); Oates, Birds, Burmah, ii, p. 319 (1883); Finn, Bull. B. O. C., viii, p. 45 (1899).

Nycthemerus andersoni, Blyth and Walden, Cat. Mamm. and Birds, Burmah, p. 149 (1875).

Gennæus andersoni, Ogilvie-Grant, Cat. Birds, B. M., xxii, p. 306 (1893); id. Hand-List, Game B., i, p. 276 (1895); Oates, Ibis. (1903) p. 95; id. Man. Game B., i, p. 337 (1898); Blanf., Fauna Brit. Ind., iv, p. 94 (1898); Ghigi, Mem. Acad. Bologna (6) v, p. 140 (1908); Ingram, Nov. Zool., xix, p. 270 (1912); Harington, J. Bomb. N. H. S., xx, p. 377 (1910).

GENNÆUS NISBETTI.

Gennæus nisbetti, Oates, Ibis. (1903) p. 99; Ghigi, Mem. Acad. Bologna (6) v, p. 140 (1908).

GENNÆUS CRAWFURDI.

Phasianus crawfurdi, Gray, in Griff. ed. Cuv., iii, p. 27 (1829).
Euplocamus crawfurdi, Hume, Str. Feath., vi, pp. 437, 521 (1878); id. xi, p. 303 (1883).

INDIAN WOOD-DESTROYING WHITE ANTS

(SECOND CONTRIBUTION.)

BY

JOSEPH ASSMUTH, S. J.

The first paper on this subject was published in September 1913 (B. N. H. J. Vol. XXII, No. 2, pp. 372—384). Since that time I have made two more long collecting excursions—one to Chota Nagpur during October-November 1913, the other to South Canara and Mysore during April-May 1914—and several short ones to Gujerat, the Bhore Ghats, etc. They have brought to light some new facts regarding our Indian wood-eating Termites, a summary of which I publish in this paper. I have again to thank most cordially the Agents of the G. I. P., B. B. & C. I., and M. & S. M. Railways, for their liberal grant of passes without which it would have been impossible to carry on my researches. I am also under great obligations to the Chief Engineer, P. W. D., Sind, and to many members of his staff for sending me a great number of specimens of Termites as well as damaged wood. If this example of co-operation would be more generally imitated by others, our knowledge of Indian noxious White Ants would soon be much nearer completion than it is now. Lastly I beg to tender my heartfelt thanks to all the many others who have in any way assisted me in my studies, especially to the Jesuit Fathers of the Calcutta and Mangalore Missions.

I propose to give in the following lines short notes first on the noxious Termites already mentioned in my preceding paper, then on some new kinds not previously recorded, and finally to add a few general observations bearing on the question of wood-destroyers.

Leucotermes indicola, *Coptotermes Heimii* (besides one or two other species of this genus), and *Odontotermes Fecæ* are "the most important wood-destroyers; Termites in houses...will in a large majority of cases be found to belong to one of these kinds." So I wrote in my first article (l. c., p. 374). I have now, after my latest investigations, come to the conclusion that this statement may be more precisely and correctly expressed thus: Termites doing damage in buildings to timber or, in fact, to any wooden structure found in them, belong in all cases to one of the abovenamed kinds, and to no other. I have examined a very large number of Termite-infested habitations in the Provinces of Bombay, Bengal, Madras, Behar and Orissa, and I did not in a single instance come across any but the said three species.

These Termites are, of course, also seen feeding on all sorts of dry wood away from houses and even in forests, just like the rest of the

wood-destroyers ; but if it is a matter of Termites doing damage in any kind of building they are certain, according to my experience, to belong to one of the just mentioned genera.

This showed itself most strikingly in the case of *Odontotermes Fecæ* in Chota Nagpur, where this species abounds. I examined dozens of its nests in garden, field and forest, and in every case—I do not remember a single exception—I found colonies of *Microtermes* associated with it. But in buildings such a companionship was never noticed ; there *Odontotermes Fecæ* held the field alone in the beams of walls as well as in the rafters of roofs.

I add a few of the more important localities where I took specimens of the wood-destroyers under discussion : *Leucotermes* found in Calcutta, Mangalore, and in villages of South Canara near the range of the Western Ghats ; *Coptotermes* in Calcutta, Mangalore, and Ranchi ; *Odontotermes Fecæ* in the lastnamed places, and also in the Ghats of South Canara up to an elevation of 3-4,000 feet.

To sum up : of the various kinds of wood-destroying Termites in India only three appear to have adapted themselves to live in buildings¹ and feed on wood contained in them ; these three occur almost everywhere throughout the Peninsula. This is of special interest, because on the one hand our wood-eating species are on the whole fairly numerous, and on the other the respective Termite Faunas of Northern, Central and Southern India exhibit considerable variety.

Special mention must here be made of Sind, for I am not quite sure whether the above statement is applicable to this Province as well. Of the many specimens taken in buildings and otherwise I have received from Sind, none belonged to either *Leucotermes* or *Odontotermes Fecæ*. *Coptotermes* was taken in different places, but the kind most often sent to me was *Microtermes*. It would therefore seem that the two firstnamed forms are not represented in Sind, whereas the last genus is far more often met with than in other parts of India, and has even acquired the habit of attacking timber in houses. But details are as yet too scanty to allow of any definite opinion on this head. I hope to settle the matter as soon as I get a chance of visiting Sind at some future time.

The peculiar custom of *Microtermes* of living associated with other Termites has already been mentioned. I often found *Microtermes* colonies in the mounds of *Odontotermes obesus*, in the nest area of *Odontotermes Fecæ*, etc. With regard to the latter “compound nests,” I came always to the conclusion—after careful examination of the feeding figures and fillings—that the attack on wood on which the Termites were seen feeding, had been started by

¹ Cp. the similar habit of the true Ants *Prenolepis longicornis* (Aitken, *Tribes on my Frontier*, p. 51 ; Wroughton, this Journal Vol. vii., p. 41), and *Plagiolopis longipes* (Wroughton, l. c. p. 385).

Odontotermes Fecæ; *Microtermes* was a later arrival which had occupied portions of the tunnels and galleries of the "host" and was now continuing the work of destruction in company with the latter.

So far I have only once succeeded in finding—at Ranchi (No. 447 of my collection)—a colony of *Microtermes* living by itself alone, with no other kind of Termites anywhere near it. This gave me the long looked-for chance of getting exact details of the feeding figure of this White Ant; for when I discovered the nest, the workers were busily engaged upon destroying a board of dealwood lying on the ground. Almost the whole of the lower as well as portions of the upper surface of the board was covered with crusts of dark earthy material, much in the same fashion as with *Odontotermes Fecæ*, except that in this case the material employed for construction was not so coarse-grained as with the latter species. After removing the earthy crust or cover, the feeding figure became clearly apparent.

As the most striking feature one should note the non-coherence of the holes eaten into the wood. One gets the impression that every individual had set to work quite independent of the rest. The result of this way of proceeding is an abundance of sporadic holes scattered irregularly all over the wood: some of them deep, some shallow, some long, some short, etc. Most of the holes are found to extend along the soft veins of the wood; a few of them however cut right across the veins, and in this case everything—hard as well as soft portions of the wood—is destroyed. I observed also tunnels constructed completely inside the wood which did not reach the surface at all; but the greater part of the feeding area was superficial.

Hence it appears that *Microtermes* when attacking wood acts in some respects like *Leucotermes* (feeding along the soft veins, and inside the wood), in others like *Odontotermes Fecæ* (destroying soft as well as hard portions of wood, feeding on the surface, building covers of earthy material). But taken as a whole the feeding figure of *Microtermes* is so characteristic that it cannot easily be mistaken for another. I hope it will be possible to give a photograph of it in one of the subsequent numbers of the Journal.

In addition to the kinds spoken of in the preceding pages I came across several new wood-destroyers in different localities. It will be sufficient for the purposes of this paper to mention them but briefly. They are of minor practical interest since they do not infest houses, but are either forest dwellers or else occur so rarely that the damage they do is insignificant.

I begin with a rather remarkable wood-destroyer of the *Eutermes* tribe¹. Colonies of this Termite were abundant in certain forests of the Western Ghats, east of Mangalore, up to about 3,000 feet above the level of the sea. It was somewhat of a surprise to

¹ For a picture of an *Eutermes* soldier, see fig. 10 on pl. 1 of my first paper: the Double-formed Fine Termite.

me to find *Eutermes* among the noxious White Ants; for all the species of it I had so far been able to observe were quite harmless creatures feeding on bits of dry grass only. Yet there could be no doubt about the destructive tendencies of this South Canara species: every piece of wood—trunks of fallen trees, withered and broken off branches, twigs, and the like—lying about on the ground in the neighbourhood of a nest, were attacked, not by a few, but by hundreds or even thousands of individuals. They were certainly the most active and voracious wood-destroyers I had ever met. Their nest is a “carton nest”, a large football-like structure hanging high up in a tree and crammed full of an astonishing number of Termites. The live tree however on which the nest is situated they never touch; they build covered tunnels down the trunk to the ground, where they devour whatever wood they can find.

A new and apparently very rare species of *Odontotermes* was taken, feeding on wood, at Khandala and Calcutta. The likeness of the soldiers of this kind to those of *Coptotermes* is remarkable: they have nearly the same brown-red head, the same porcelain-white abdomen, the same milky-white secretion when irritated (for description of *Coptotermes*, see preceding paper, p. 377). But the tooth on their left mandible leaves no doubt that they belong to the genus *Odontotermes*. Moreover their two-sized workers, with blackish abdomen, are recognised at a glance as members of this tribe.

New species of *Microcerotermes* were observed at Mangalore and Navoor, a village at the foot of the Ghats about 50 miles east of the former place. More interesting, from a purely scientific point of view, was the discovery of a colony of *Cryptotermes* at Bangalore, probably the first representative of this genus recorded from the Indian Continent. The nest had been constructed in a dried up stump of a branch of a live *Ficus* tree.

The question has often been put to me: What about the occurrence of wood-destroying Termites in mountainous districts? My observations in the Ghats of South Canara and Mysore have convinced me that, in the said region at least, none are found higher up than 3-4,000 feet above the level of the sea. I have, indeed, taken White Ants on the very top of the Kudre Mukh mountain, *i.e.*, more than 6,000 feet high; but they were of the harmless *Capritermes* kind. The task of removing dry wood and thus making room for fresh growth which is so effectively carried on by wood-eating White Ants in the lower parts of the Ghats, has, in the extensive forests covering the heights above 4,000 feet, apparently devolved on larvæ of various kinds of Coleoptera (*Buprestidæ*, *Longicornia*, etc.). Nearly all the pieces of dry wood I examined up there showed signs of attacks of beetle larvæ; these signs are so characteristic that they cannot be mistaken for Termite feeding figures.

I add a few remarks referring to the moot point, whether Termites destroy live plants and trees. I can only repeat what I wrote in my previous paper (l.c.p. 381, foot note): none of the wood-destroyers I have seen feed on live plant tissue. Wherever I came across green plants or trees infested by Termites—and I have examined a good many—I could always ascertain that only dry and decaying portions of wood, or else mosses and lichens growing on the surface of the bark, were being devoured by the White Ants; where the live tissue began, the tunnels and burrows of the Termites ceased.

I am glad to be able to quote in confirmation of my views the opinion of Mr. A. V. d. Poorten, a Ceylon planter of large experience in cocoanut, etc., cultivation, whose acquaintance I made last May. In the course of our conversation he told me—quite unsolicited on my part—he was convinced that White Ants never started an attack on healthy trees. Where he had found them feeding on trees, the first injuries could, as a rule, be traced to some other cause; the Termites had put in their appearance only later on to complete the destruction of the already diseased portions of the tree.

The following significant fact may throw some light on the belief of many people in India that Termites destroy live plants. During the last two years insects labelled “White Ants, very injurious to crops”, were sent to me from three different places, *viz.*, Ranchi, Ahmednagar, and Anand (Nos. 422, 10S, and 596 of my collection). Examination of the specimens received showed however that none of them were White Ants, but all belonged to a species of light-brown or yellowish genuine Ants (*Formicidæ*) of the *Dorylus* tribe. This Ant may well be mistaken for a Termite by a casual observer.

Until, therefore, convincing evidence to the contrary is produced I hold that the Termites of the Indian Continent—of others I have no practical experience—are innocent of the damages to crops or live plants so often attributed to them. Either the plants were already diseased when falling a prey to the White Ants, or else the culprit is not a “White Ant,” but a “real Ant.”

BOMBAY NATURAL HISTORY SOCIETY'S
MAMMAL SURVEY OF INDIA, BURMA AND CEYLON.

REPORT No. 17.

BY R. C. WROUGHTON.

COLLECTION	...	...	No. 17.
LOCALITY	...	...	S. Tenasserim.
DATE	...	...	December 1913-April 1914.
COLLECTED BY	...	...	Mr. G. C. Shortridge.
EARLIER REPORTS...	...	...	No. 1, East Khandesh, Vol. XXI, p. 392, 1912; No. 2, Berars, Vol. XXI, p. 820, 1912; No. 3, Cutch, Vol. XXI, p. 826, 1912; No. 4, Nimar, Vol. XXI, p. 944, 1912; No. 5, Dharwar, Vol. XXI, p. 1170, 1912; No. 6, Kanara, Vol. XXII, p. 29, 1913; No. 7, Central Provinces, Vol. XXII, p. 45, 1913; No. 8, Bellary, Vol. XXII, p. 58, 1913; No. 9, Mysore, Vol. XXII, p. 283, 1913; No. 10, Kathiawar, Vol. XXII, p. 464, 1913; No. 11, Coorg, Vol. XXII, p. 486, 1913; No. 12, Palanpur, Vol. XXII, p. 684, 1913; No. 13, South Ceylon, Vol. XXII, p. 700, 1913; No. 14, N. Shan States, Vol. XXII, p. 710, 1913; No. 15, Kumaon, Vol. XXIII, p. 282, 1914; No. 16, Dry Zone, Central Burma and Mount Popa, Vol. XXIII, p. 460, 1915.

The present collection represents the fauna of the most Southern portion of the Province of Burma. The area covered by it lies between 10° and $13^{\circ} 30'$ N. Latitude, corresponding with the Mergui District of Tenasserim. This District is a long narrow strip, bounded on the West by the Bay of Bengal, and on the East by Siam. In its Northern portion the Tenasserim River runs southward down the centre, separated from the sea by a mountain range, whose highest point is the peak of Myinmoletkat (6,800 ft.). The rest of the District is low-lying broken ground, a good deal of which is covered by the Sea at high tide, and a large amount of the remainder is liable to be flooded during the rains. The total area is 9,798 square miles, and the population about 10 to the square mile. The average rainfall is 163 inches, and the temperature ranges between 93° and 68° . Practically the District, except about 140 square miles of cultivation and perhaps a similar area of old "Toungya" clearings, is under dense forest of which nearly 1,000 square miles is mangrove.

The following are descriptions of the actual camps visited, as furnished by Mr. Shortridge:—

"*Victoria Point*.—Situated at the extreme South of the District. Surrounding country hilly, with no flat country in the immediate neighbourhood. The land around the township has been more or less cleared, and these clearings, being now covered with grass, give the place a somewhat barren appearance during the dry

season. Quite a short distance inland, however, the usual evergreen jungle commences.

Bankachon.—A very small Malay village (Bankasun of Davison), composed of about twenty houses, situated at the high tide limit of one of the many small creeks that flow into the Pakchan River, about 17 miles inland from Victoria Point. With the exception of one or two rubber plantations, this is the only populated spot between the Point and Maliwun. The country is partly flat with mangrove swamps on the Pakchan side of the village. On the other side the hills, that run along the peninsula, here reach a height of less than 1,000 feet. With the exception of a little cultivation round the village, the surrounding country is under dense evergreen jungle.

Maliwun.—A small township, at the head of a creek flowing into the Pakchan. It owes its present existence chiefly to the Burma Development Syndicate, which owns a large rubber estate, and the Kyuli Tin Mines, about four miles further inland. The surrounding country, owing to old 'Taungya' clearings, now under grass, has a more or less open, park-like appearance, which is however again surrounded by evergreen jungle, similar to that round Bankachon.

Victoria Island.—A small island, about 2 miles off Victoria Point. Rough, hilly country, but not rising to more than 200 feet. Covered with the dense evergreen jungle that is characteristic of all the islands of the Mergui Archipelago. A visit of only 2 days was paid, but when the Archipelago is worked later on, a longer camp might well be made.

Mergui Town.—Head-quarters of the District, on an island in the Delta of the Tenasserim River, only separated on one side from the main land by a narrow creek. Situated in Latitude $12^{\circ} 26'$ N., Longitude $98^{\circ} 36'$ E. It is protected by the hill island of Pataw, which helps to form a good natural harbour, and farther out by a ring of islands, including King Island, the largest in the Mergui Archipelago. Population about 12,000. Around the town the country is largely under cultivation, including the 'Crown' and several other Rubber Estates. The remainder of the Island is covered with mangrove and scrub jungle.

Tenasserim Village.—Situated in Latitude $12^{\circ} 6'$ N. and Longitude $99^{\circ} 3'$ E., at the confluence of the great and little Tenasserim Rivers, 45 miles up stream from Mergui. The village, which now contains barely 100 houses, is on low ground, surrounded by fruit orchards, on the site of the ancient city of Tenasserim, which for several hundred years was the principal port of Siam, and the gateway of the most direct route to the Far East. There are still remains of the old walls, enclosing an area of about 4 miles. The city is said to have been founded in 1373, and was conquered and destroyed by the Burmese in 1759. The surrounding country is covered with

secondary growth jungle, and is shut in by hills which rise to upwards of 1,000 feet.

Thaget.—The Tenasserim Hevea Rubber Estate, on the Tenasserim River, about 60 miles above Mergui. It is accessible by launch at all seasons. The area of the Estate is 5,000 acres, of which about 800 acres have been cleared and planted. The average rainfall, 100-110 inches, is strikingly less than that near the coast, or even as far inland as Tenasserim village, where it often exceeds 200 inches.

Tagoot.—About 75 miles up the Tenasserim River, a tin mining district, it is surrounded chiefly by bamboo jungle.

Banlaw.—About 55 miles up the great Tenasserim River. A small village on the North bank, surrounded by fruit orchards. Flat country, paddy fields, and scrub jungle."

In all 1,024 specimens were obtained, of which 4 are missing or have not been sent to me. Twenty-eight others are from places outside the area dealt with in this Report, these will be found listed in a supplement. The remaining 1,000 specimens belong to 64 species, in 52 genera.

A feature of this collection which causes surprise is the almost complete absence of the really small mammals (exclusive of the Bats). One Pigmy Shrew and the specimens of *Chiropodomys* are the only ones which can be placed in this category, even the ubiquitous *Mus booduga** is unrepresented. The constant flooding of such large areas, as reported by Mr. Shortridge, is possibly to a certain extent responsible for this fact. *Chiropodomys* is an arboreal animal, which would be less inconvenienced by floods than *Mus*, *Leggadilla*, &c., but it is probable that large areas of heavy continuous forest is unsuited to the welfare of the smaller types of mammals.

Of the 64 species recorded, more than 40 or 2/3 of the whole are new to our Survey Lists, three are quite new and have been described by Mr. Thomas on an earlier page of this Journal. (Vol. xxiii, pp. 205, 413, 612).

Of the species recorded in this Report, all the true Monkeys; the Bat, *Emballonura monticola*; *Gymnura* and *Galeopterus* among the Insectivores; *Arctictis* and *Hemigalus* among the Carnivores; and the Rodents, *Epimys vociferans*, *E. validus*, *Gunomys varius*, and the bush tailed porcupine (*A. macrourus*) are at or very close to their Northern limit.

Mr. Shortridge records the following notes on animals which he failed to meet with though they have been recorded from this region.

"*Pithecus arctoides*.—I could get no information of any kind of a stump-tailed Monkey in the District.

Pteropus.—Said to be plentiful, especially at Mergui, at certain times of the year.

(If any Member would obtain a series of these they would be a most valuable acquisition. There are three species, one or more of which might be found hereabouts, viz., 1. *Pt. hypomelanus geminorum*, Mill. from S. Twin Islands; 2. *Pt. intermedius*, K. And., from Amherst, the type of which is the only specimen known; 3. *Pt. lylei*, K. And., a dwarf species from S. Siam.)

Felis pardus, L.—Plentiful round Victoria Point, a considerable proportion of specimens being melanistic.

Vernacular name.—RIMAU-BINTANG (Malay, Bankachon).

Felis sp.—A cat, known as KUCHING-JALANG, is said to occur rarely round Bankachon; this may be *F. viverrina*.

Prionodon maculosus, Blanf.—I could get no information about this animal, though a specimen has been recently recorded from Siam, near the Tenasserim boundary.

Cuon rutilans, Muell.—Said to be very rare in the District.

Vernacular name.—SIGALA, or SRIGALA (Malay, Bankachon).

Arctonyx sp.—The Hog-badger appears to be very rare.

Vernacular name.—KHWE-HTU-WET-HTU (Burmese); MAMBARANG (Malay, Bankachon).

Lutra sp.—Otters are said to be fairly numerous inland, but near the Coast and on the lower course of the Tenasserim River they are rare or absent.

Ursus torquatus, Wagn.—Has occasionally been shot by residents.

Vernacular name.—BRUANG-OURANG (Malay, Bankachon).

Ursus malayanus, Raff.—Probably more plentiful than *torquatus*.

Vernacular name.—BRUANG (Malay, Bankachon).

Elephas.—Elephants were seen round Bankachon and Maliwan.

Vernacular name.—GAJA (Malay, Bankachon).

Rhinoceros sondaicus, Cuv.—

Vernacular name.—KYANT-SIN (Burmese); BADA-K-TAM-PONG (Malay, Bankachon).

Tapirus indicus, Cuv.—Said to be rare round Victoria Point. Mr. C. B. Hall tells me that he once found the remains of one, that had been killed by a tiger, near his Estate.

Vernacular name.—GAJA-MENA (Malay, Bankachon).

Bibos gaurus, H. Sm.—Said to be plentiful round Maliwun.

Vernacular name.—SLADANG, or SALADANG (Malay, Bankachon).

Bibos sondaicus, Muell.—Said to occur 40 miles inland from Victoria Point.

Vernacular name.—SAPI-LUMBOO (Malay, Bankachon).

Capricornis, sp.—Serow are said to exist on the Hills north of the Tenasserim River.

Manis javanica, Desm.—Said to be uncommon.

Vernacular name.—TANGILING (Malay, Bankachon).''

Mr. Shortridge records his special obligation to the following gentlemen :—

Mr. G. P. Andrew, I.C.S., Dist. Commissioner.

Mr. C. E. Fisher, Inspector of Police, “placed the local Police boat at my disposal on many occasions, a very considerable help in a country where there are very few means of transport.”

Mr. R. Lamb, Estate Manager at Maliwun under the Burma Development Syndicate, “put me up and gave me every assistance.”

Mr. C. F. S. Bilbrough, the owner of Victoria Island, “has promised to help in every possible way when a more exhaustive survey of this Island is undertaken.”

Mr. J. Taylor, Manager of the Hevea Rubber Estate at Thaget, “gave me every help.”

(Before going on to my detailed report, I would venture to point out that if any of our members resident in these parts could and would obtain more specimens of the Pipistrel obtained by Mr. Shortridge at Maliwun, such would be most valuable.)

(1) HYLOBATES LAR, L.

The White-handed Gibbon.

1771. *Homo lar*, Linnaeus, Mantissa, App., p. 521.

1888. *Hylobates lar*, Blanford, Mammalia No. 2.

♂ 17, ♀ 10, Bankachon; ♂ 1, Tenasserim; ♂ 1, ♀ 2, Thaget.

H. lar much resembles *H. hoolock* except for its white hands and feet. Blanford says of its colour “occasionally much variegated”, but in the present series the specimens are either jet black or fulvous, with a darker shade on the back, the latter much predominating.

“Very plentiful around Victoria Point. Although not avoiding the neighbourhood of habitations, Gibbons hardly ever leave the forests and are probably seldom destructive to ground crops. They are particularly noisy in the early mornings and evenings. The calls of all Gibbons have a certain resemblance to each other, consisting in the case of this species of a series of rapid whoops, ascending and descending through several octaves, rather resembling a siren and are amongst the most striking and musical sounds to be heard in any tropical jungle. They are nearly always gregarious, going about in parties of about a dozen; where they are numerous, several parties may sometimes mingle together temporarily, but I have never seen flocks of a hundred or more as reported by Blanford. *H. lar* is excluded in Davison’s list of Mammals from Bankachon.”

Weights.—♂, 16 $\frac{3}{4}$ lbs.; ♀, 15 lbs.

Vernacular name—MAWA (Malay, Bankachon).

(2) PITHECUS FASCICULARIS, Raffles.

The Crab-eating Monkey.

1822. *Simia fascicularis*, Raffles, Trans. Linn. Soc., XIII, p. 246.

1825. *Macacus carbonarius*, F. Cuvier, Hist. Nat. Mamm., pl. XXXII.

1831. *Macacus aureus*, Is. Geoffroy, Voy. Bel. Zool., p. 58.

1888. *Macacus cynomolgus*, Blanford, Mammalia No. 9.

♂ 1, Victoria Island; ♀ 1, Bankachon; ♂ 1, Mergui; ♂ 3, ♀ 9, Tenasserim; ♂ 5, ♀ 3, Thaget; ♂ 2, Banlaw.

This Macaque is not strikingly different from the common "Bengal Monkey" except in its far longer tail, which is scarcely shorter than the combined head and body, while in the Indian Monkey it is less than $\frac{3}{4}$ that length. In size the two are identical.

Blanford recognises that "*cynomolgus*" of Linnaeus is a totally different animal but retained the name for convenience, which is of course inadmissible. He includes in his synonymy the name *irus* proposed by F. Cuvier in 1818. Bonhote dealt with the matter in 1903 (Fascic. Malay 1, p. 4) and showed that *irus* was based on a Senegal Monkey and that the earliest name for the Malay-Tenasserim long tailed Macaque is *fascicularis* of Raffles. Later Dr. Elliot in his Review of the Primates, 1913, p. 229, revives *irus* as a name for a Burma-Malay Macaque 'with black feet' (a character originally postulated by Cuvier) but, though some specimens seem to have somewhat darker feet, I have found no Oriental Macaque with black feet in the National Collection. I have therefore followed Bonhote, Miller, &c., in adopting the name *fascicularis*. This monkey seems to vary a good deal in colouring, but these variations would seem to be individual and perhaps even seasonal. These variations account for the names *carbonarius* and *aureus* in the synonymy given above.

"Although extremely plentiful where it occurs, this species is here entirely confined to the neighbourhood of Mangrove Swamps along the Sea-shore, and the banks of rivers. Its chief habitat is along the edges of tidal creeks where at low tide it feeds on molluscs, crustaceans and other marine animals. It was so local round Victoria Point that, although swarming along the banks of the Pakchan River, it was not once seen near Bankachon only a few miles away from the River.

Weight.—♀, 10½ lbs.

Vernacular name.—KRA (Malay, Bankachon.)"—G. C. S.

(3) PITHECUS ADUSTUS, Mill.

The Malay pig-tailed Monkey.

1888. *Macacus nemestrinus*, Blanford, Mammalia No. 8.

1906. *Macaca adusta*, Miller, Proc. U. S. Nat. Mus., XXIX, p. 559.

♂ 3, ♀ 4, Bankachon.

About the size of, or rather smaller than, the 'Bengal Monkey' but more stoutly built. Dark brown in colour. In *nemestrinus* from Sumatra there is a broad black stripe down the centre of the back which is obsolescent or entirely wanting in the Malay animal.

Miller distinguished *adustus* (Type locality Champang, Tenasserim) from *nemestrinus*, which was named by Linnæus from Sumatra, by the almost complete absence of the dorsal black stripe and by the black annulations present on the hairs of the back. There are also skull differences and the male canines are less developed than in *nemestrinus*.

"Plentiful, although not to the same degree as *H. lar* and *P. obscurus*. Like other Macaques, this species is very variable in size, and there is also a considerable difference in size between the sexes. During life the eye orbits in adults are bluish. Gregarious, and when occurring in numbers around villages it is said to be very destructive among rice fields. The cheek pouches of most of the specimens obtained were full of rice. This species is very often seen in confinement.

Weight.—♂, 18 lbs.; ♀, 10¼ lbs.

Vernacular names.—BRUH, BRUH-TANA (Malay, Bankachon)."—G. C. S.

(4) PRESBYTIS OBSCURUS, Reid.

The Dusky Leaf-Monkey.

1837. *Semnopithecus obscurus*, Reid, P. Z. S., p. 14.

1888. *Semnopithecus obscurus*, Blanford, Mammalia No. 24.

♂ 5, ♀ 12, Bankachon ; ♂ 2, Tenasserim ; ♂ 1, Thaget.

This is a dark coloured Langur. Brownish black above, paler on the shoulders and forearms, tail silver-grey. Under side, hind limbs and crown of the head greyish-white, hands and feet black.

In his synonymy Blanford says Reid gave no description but this is incorrect. The full passage referred to is as follows :—" Mr. James Reid exhibited to the Meeting, and characterised as new, under the name *obscurus*, a dark-coloured monkey, from the Society's Collection, belonging to the Genus *Semnopithecus*. The locality of the particular specimen before the Meeting was unknown." This is technically a 'good' description if the name can be assigned, on reasonable evidence, to the animal in question. (There are two specimens in the National Collection, either of which might be the type, but I have failed, in spite of careful enquiry, to obtain any history which would connect either of them with Reid's specimen.) However in the following year Martin, Superintendent of the Museum of the Zoological Society, published a Monograph of the Genus *Semnopithecus* (Charlesworth's Mag. Nat. Hist., II, p. 434) in which he includes "*S. obscurus*, Reid." He says: "This Species was lately described as new at the scientific meeting of the Zoological Society, 1837", and gives an unmistakeable description of the present animal. There can be no doubt that the present animal is Reid's *obscurus* and the name must stand on his authority.

"Almost as plentiful as *H. lar*, but a much less noisy animal. Its alarm note is almost like that of a Macaque, and quite unlike the curious hoot of the Indian Langurs. It is rather shy and keeps well within the thickest jungles.

The white orbital regions and the pinkish-white round the mouth are as in *phayrei*, except that the orbits are not bluish but rather dead white, and do not surround but extend in semi-circles round the upper and outer margins of the eyes only. The area round the mouth is also less clearly defined, being often mottled round its edges. The hair on the crown, though long and very silky, does not form a true crest. The newly born young are bright golden yellow in colour, in rare cases this colour is retained through life.

Weight.—♂, 19½ lbs., ♀, 19 lbs.

Vernacular names.—LUTONG, LUTONG-LABOO (Malay, Bankachon)."
—G.C.S.

(5) PRESBYTIS FEMORALIS KEATII, Rob. and Kl.

Keat's Leaf Monkey.

1830. *Semnopithecus femoralis*, Horsf., App., Life of Sir T. S. Raffles (no description).

1833. *Semnopithecus femoralis*, Martin, Charlesworth's Mag., N. H., II, p. 436.

1876. *Semnopithecus neglectus*, Schlegel, Mus. Pays. Bas., XII, p. 47.

1888. *Semnopithecus femoralis*, Blanford, Mammalia No. 25.

1911. *Presbytis neglecta keatii*, Robinson and Kloss, Journ. Fed. Mal. St. Mus., IV, p. 174.

♂ 3, ♀ 1, Bankachon.

A black-brown Langur, with the inside of the thigh, in a narrowing line down the inside of the hind leg, to the heel, pure white.

“Apparently not at all plentiful—possibly only just extending into Tenasserim—and rather shy. The facial area is very small and quite unlike other Burmese and Indian Langurs. The mouth has the usual pinkish-white area but the orbital region, though pale, is dusky flesh colour and not a conspicuous feature. The two radiating centres on the forehead are hardly visible during life, though very noticeable in dry skins.

Weight.—♂, $15\frac{1}{2}$ lbs., ♀, $14\frac{1}{2}$ lbs.

Vernacular name.—LUTONG-KOKA (Malay? Bankachon.)”—G.C.S.

(6) NYCTICEBUS COUCANG, Bodd.

The Slow Loris.

1785. *Tardigradus coucang*, Boddaert, Elench. Anim., Vol. I., p. 67.

1812. *Nycticebus bengalensis*, Geoffroy, Ann. Mus., XIX, p. 164.

1867. *Nycticebus cinereus*, Milne Edwards, Nouv. Arch. du Mus., III., p. 1.

1888. *Nycticebus tardigradus*, Blanford, Mammalia No. 26.

♂ 1, Mergui.

Thomas has shown that the *tardigradus* of Linnaeus refers to the Ceylonese Slender Loris. The next oldest name is *coucang*, Bodd. The name was given to Pennant's "Tailless Maucauco" from Bengal. We have no specimen of a Bengal individual but when such is available, if it prove to be distinct from the Tenasserim animal, the latter will have to take the name *cinereus*, M. Edw. I have compared this specimen with one of the co-types of *cinereus* and cannot detect any difference.

This is a pretty little animal about 12 or 13 inches long. It has practically no tail. The hair is long, soft and curly. The colour is a warm grey, washed more or less over the whole upper side of the body with rusty. There is a narrow dark line from the base of the tail forward to the crown; at that point lines branch to the ears and eyes.

“Apparently fairly well known on Mergui Island. Very savage, growling like a cat when approached and always ready to attack anything placed near it. Except for its rather slower movements very similar in general habits to the Slender Loris.

Weight.— $3\frac{1}{4}$ lbs.”—G.C.S.

(7) ROUSETTUS LESCHENAULTI, Desm.

The Fulvous Fruit Bat.

(Synonymy in No. 11.)

♂ 5, ♀ 6, Tagoot.

(See also Reports Nos. 15 and 16.)

(8) CYNOPTERUS BRACHYOTIS ANGULATUS, Mill.

The Malay Short-nosed Fruit Bat.

1839. *Cynopterus brachyotis*, Müller, Tigd. Nat. Gesch., V., p. 146.

1891. *Cynopterus brachyotis*, Blanford, Mammalia No. 139.

1898. *Cynopterus angulatus*, Miller, Proc. Ac. N. Sci. Philad., p. 316.

♂ 1, Victoria Point; ♂ 2, ♀ 8, Bankachon; ♂ 4, ♀ 22, Tenasserim.

This Bat differs from *Cynopterus sphinx*, the common Fruit Bat of India, rather in size than in colouring. The fore arm is shorter and the ears relatively smaller.

“Plentiful, roosting by day on the under sides of palm and plantain leaves, sometimes singly or in pairs, but more usually in small colonies.

Vernacular name.—KLAWA (all small bats) (Malay, Bankachon).”—G.C.S.

(9) *EONYCTERIS SPELAEA*, Dobs.

Dobson's Long-tongued Fruit Bat.

1871. *Macroglossus spelaeus*, Dobson, Proc. A. S. B., pp. 105, 106.

1891. *Eonycteris spelaea*, Blanford, Mammalia No. 144.

♂ 11, ♀ 7, Tagoot.

This bat rather resembles *Rousettus*, but is more warmly coloured above and darker below, but is at once separable from any of that genus as well as from *Cynopterus*, by the absence of a claw on the index finger.

“Plentiful in a cave near Tagoot, in company with other small Fruit Bats and *Emballonuridae*.”—G.C.S.

(10) *MACROGLOSSUS MINIMUS SOBRINUS*, K. And.

The small Long-tongued Fruit-Bat.

1810. *Pteropus minimus*, Geoffroy. Ann: Mus: d' H. N. XV. p. 97.

1891. *Carponycteris minima*, Blanford. Mammalia. No. 143.

1911. *Macroglossus minimus sobrinus*, K. Andersen, A.M.N.H. VII. p. 642.

1 (juv.). . Bankachon.

The specimen is too young for confident identification. Dr. Andersen in his Catalogue of the Chiroptera (p. 761) writes “It is probably this form which has been recorded in literature from Tenasserim.” I have therefore ranked it under that name.

(11) *NYCTERIS JAVANICA*, Geoff.

The Javan Long-eared Bat.

1813. *Nycteris javanicus*, Geoffroy, Am. du. Mus. XX., p. 20.

♂ 1, ♀ 1, Bankachon.

This Bat somewhat resembles a *Megaderm*, especially in its very large ears and the presence of both a nose leaf and a tragus, the latter however is very small. Blanford does not include this species in his Fauna but quotes Dobson to the effect that it had been found in the Malay Peninsula and Java. (Mammalia, p. 295.) It is the only species found in the Oriental Region, all the rest of the Genus being African. These so far as I can discern are the first specimens taken within Indian limits.

“A single pair were driven out of a porcupine burrow in thick evergreen forest by one of my ferrets.”—G.C.S.

(12) *RHINOLOPHUS LUCTUS*, Temm.

The Malayan Great Horse-shoe Bat.

1835. *Rhinolophus luctus*, Temminck, Mon. Mamm., II., p. 24.

1842. *Rhinolophus morio*, Gray, A. M. N. H., X., p. 257.

1891. *Rhinolophus luctus*, Blanford, Mammalia No. 145 (partim).

♀ 1, Bankachon.

Dr. Andersen has recognised *perniger*, Hodgs., as a separate species and has established *beddomei* to represent the North Indian (Himalayan) and the South Indian forms respectively. All three are included by Blanford under the name *luctus*. It is a large, black *Rhinolophus*, with a large and complicated nose-leaf.

“This specimen was found roosting by itself during the day in thick foliage. All allied species hitherto found were in hollow trees, caves or wells, but always singly or in pairs.”—G.C.S.

(13) RHINOLOPHUS TRIFOLIATUS, Temm.

The Trefoil Horse-shoe Bat.

1835. *Rhinolophus trifolius*, Temminck, Mon. Mamm., II, p. 27.

1891. *Rhinolophus trifolius*, Blanford, Mammalia No. 147.

♀ 2, Bankachon.

This would seem to be a rare Bat. It is of medium size and a pale colour; the nose leaf, though proportionally large, is not so complicated as in *luctus*, with which it is fairly closely related.

“Both these specimens were found by day, roosting in thick foliage”.—G.C.S.

(14) HIPPOSIDEROS FULVUS, Gray.

The Bicoloured Leaf-nosed Bat.

(Synonymy in No. 3.)

♀ 1, Bankachon; ♂ 1, ♀ 3, Tenasserim.

(See also former Reports Nos. 3, 5, 6, 7, 8, 9, 10, 12, 13, 14 and 16.)

“This species was found roosting by itself, inside a house”.—G.C.S.

(15) HIPPOSIDEROS LARVATUS, Horsf.

Horsfield's Leaf-nosed Bat.

1824. *Rhinolophus larvatus*, Horsfield, Res. Java pt. VI.

1824. *Rhinolophus vulgaris*, Horsfield, 1, c.

1824. *Rhinolophus deformis*, Horsfield, 1, c.

1824. *Rhinolophus insignis*, Horsfield, 1, c.

1891. *Hipposiderus larvatus*, Blanford, Mammalia No. 165.

♂ 14, ♀ 9, in al. 4, Bankachon.

A medium sized *Hipposideros*, with 3 supplementary leaflets in the nose leaf, as in *dukhunensis*. Like *fulvus* it is most variable in colour; in the present series there are specimens which are quite brown, while others are flaring ochraceous rufous, and there are others of intermediate shades. It is markedly larger and stouter than *dukhunensis*.

“Found swarming in the shafts of the Kyuli Tin Mines near Maliwun.”—G.C.S.

(16) MEGADERMA SPASMA TRIFOLIUM, Geoff.

The Malay Vampire Bat.

(Synonymy in No. 5.)

♂ 1, Victoria Point; ♂ 1, Bankachon.

(See also Reports Nos. 6, 11, and 16.)

“Only two specimens were obtained, both found roosting, singly, inside verandahs.”—G.C.S.

(17) PIPISTRELLUS LOPHURUS, Thos.

The Tuft-tailed Pipistrel.

1915. *Pipistrellus lophurus*, Thomas, Journ., B.N.H.S., Vol., XXIII, p. 413.

♂ 1, Maliwun.

This species is described by Mr. Thomas on an earlier page.

The most striking outwardly visible character is the tuft of hairs on a gland at the base of the tail.

"This was the only Pipistrel observed during the whole of my stay at Victoria Point."—G. C. S.

(18) SCOTOPHILUS WROUGHTONI, Thos.

Wroughton's Bat.

(Synonymy in No. 1.)

♂ 3, ♀ 6, Tenasserim Town ; ♂ 1, Pyinmana. T. A. Hauxwell, I. F. S.

(See also Reports Nos. 5, 6, 7, 9, 10, 11, 12, 15 and 16.)

"Found roosting in company with *T. longimanus*."—G. C. S.

(19) TYLONYCTERIS PACHYPUS, Temm.

The Club-footed Bat.

(Synonymy in No. 5.)

♂ 1, ♀ 3, Bankachon ; ♂ 2, Thaget.

(See also Reports Nos. 6, 11 and 14.)

"Not observed to be plentiful. Bats, especially the early flying *Vespertilionidæ*, were by no means so plentiful as might have been expected at Victoria Point."—G. C. S.

(20) MYOTIS MURICOLA, Gray.

The Wall Bat.

1841. *Vespertilio muricola*, Hodgson, J. A. S. B., X, p. 908 (no description).

1846. *Vespertilio muricola*, Grey, Cat. Mamm. Nep. Thib, p. 4.

1891. *Vespertilio muricola*, Blanford, Mammalia No. 212.

♂ 1, Tenasserim.

Mr. Thomas, who has kindly examined this Bat, furnishes the following note :—

"This specimen has the posterior of the two small premolars more internal than usual, not visible externally. But examples from Selangore (Butler) and Java (Shortridge) agree with the type from Nepal, so that the variation does not seem to be geographical.

It may be noted that the type of *M. siligorensis*, Tomes, (with which *M. darjelingensis*, in the absence of a type, may be synonymized) proves to be the species with extraordinarily small canines described by Dobson as *Vespertilio nepalensis*.

V. caliginosus, Tomes, and *V. blanfordi*, Dobs., as exemplified by typical specimens, both appear to be referable to *M. mystacinus*. Should the Indian form of this Bat prove separable from the European, the former of these names would be applicable to it."—O. T.

"A fairly early flier, apparently seldom leaving the shelter of trees."—G. C. S.

(21) EMBALLONURA MONTICOLA, Temm.

The Malay Sheath-tailed Bat.

1839. *Emballonura monticola*, Temminck, Tijds. & Nat. Gesch., V, p. 25.

1891. *Emballonura semicaudata*, Blanford, Mammalia No. 217.

1898. *Emballonura peninsularis*, Miller, Proc. Ac. Nat. Sc. Phil., p. 323.

♂ 29, ♀ 19, in al. 12, Victoria Point; ♀ 1, Bankachon.

This small bat at first sight looks like *Pipistrellus ceylonicus*, but the tail is much shorter than the interfemoral membrane, from which only the extreme tip of it protrudes, this distinguishing it from its near relation *Taphozous*. The type locality is Java.

Mr. Thomas, who has most kindly compared these specimens, gives me the following note for the Report:—

“These specimens, like those referred to in 1909 (Thomas & Wroughton, Journ., Fed. Mal. States Mus., Vol. IV., p. 110, 1909) represent Miller’s *E. peninsularis*, but as further comparison fails to reveal the slightest difference between them and representative examples of *E. monticola* from Java, I now use the earlier name.

This is the most northern record of the genus *Emballonura*, Mr. Miller’s examples of *E. peninsularis* having come from Trong”.—O. T.

“A colony of from 100 to 150 was found in a small rock cave, among some boulders, in the bed of a small hill stream, in thick evergreen forest about 4 miles from Victoria Point. A few specimens were observed around Bankachon. It is an early flier and its flight is very like that of a Pipistrel.

Weight of 6 specimens— $1\frac{1}{3}$ ozs.”—G. C. S.

(22) TAPHOZOUS MELANOPOGON, Temm.

The Black-bearded Sheath-tailed Bat.

(Synonymy in No. 1.)

♂ 4, Tagoot.

(See also Reports Nos. 2, 3, 4, 6, 7, 8, 10, and 16.)

“Taken in a cave near Tagoot, where it was the least plentiful of several species found there.”—G.C.S.

(23) TAPHOZOUS LONGIMANUS, Hardw.

The Long-armed Sheath-tailed Bat.

(Synonymy in No. 6.)

♂ 3, ♀ 20, Tenasserim Village.

(See also Reports Nos. 7, 8, 9, 12, and 16.)

(24) CHOEREPHON PLICATUS, Buch.

The Indian Wrinkle-lipped Bat.

1800. *Vespertilio plicatus*, Buchanan, Trans. L. S. V., p. 261.

1824. *Nyctinomus tenuis*, Horsfield. Zool. Res. Java.

1830. *Dysopes murinus*, Gray and Hardwicke, Ill. Ind. Zool., I., pl. 1.

1891. *Nyctinomus plicatus*, Blanford, Mammalia No. 225.

♂ 27, ♀ 16, in al. 25, Tagoot.

The type locality of this Bat is “Puttahaut, in Bengal”. It generally resembles *Nyctinonus tragatus*, like which it has the upper lip vertically wrinkled, but the tail is longer and more than half of it extends beyond the interfemoral membrane. *C. plicatus*, however, is easily recognised by its bicoloured underside, the throat being brown while all the rest of the underside is washed with white contrasting strongly with the throat colour.

“Found in swarms in a cave near Tagoot, in company with several other species, all of which it outnumbered considerably.”—G. C. S.

(25) TUPAIA BELANGERI, Wagn.

*The Tenasserim Tree Shrew.*1841. *Cladobates belangeri*, Wagner., Schr. Saug. Supp. II, p. 42.1842. *Tupaia peguanus*, Lesson, Nouv. Tab. Mamm., p. 93.1888. *Tupaia ferruginea*, Blanford, Mammalia No. 102.

♂ 2, Victoria Point; ♂ 7, ♂ 6, Bankachon; ♂ 5, ♂ 2, Tenasserim Village; ♂ 2, Tagoot; ♂ 4, ♂ 1, Banlaw.

The type locality of *T. ferruginea* is Sumatra, it belongs to a section of the Genus with two pairs of mammae, whereas the present animal has three. *T. belangeri* was first taken at Siriam near Rangoon; it differs chiefly in colour from *chinensis*, And. (Kakhyen Hills) and *siccata*, Thos. (Dry Zone and Shan States) and these latter must both rank as geographical races of *belangeri*.

"Tree shrews were no more numerous here than in the almost treeless portions of the Dry Zone; there, however, they frequented chiefly the trees planted round the villages.

Weight.— $4\frac{1}{4}$ - $5\frac{1}{4}$ ozs.

Vernacular name—TUPAI-TANA (Malay, Bankachon)."—G. C. S.

(26) GYMNURA GYMNURA, Raffles.

*Raffles's Gymnura.*1822. *Viverra gymnura*, Raffles, Trans. Linn. Soc., XIII, p. 272.1827. *Gymnura rafflesi*, Horsfield and Vigers, Zool. Journ., III, p. 248.1888. *Gymnura rafflesi*, Blanford, Mammalia No. 109.

♂ 6, ♂ 3, Bankachon.

This animal was first described under the specific name *gymnura* by Raffles. Later Horsfield and Vigers established a new genus to receive it which they called also *Gymnura* and changed the specific name to *rafflesi*. For this latter however there was no authority, hence the species must stand under the name I have given it above.

This animal is perhaps most like a Bandicoot, but the snout is much elongated. The head, shoulders and about half the back are white with a varying admixture of black hairs. (There is a black streak over the eye varying in size and intensity in various individuals.) The whole of the rest of the body and limbs is black. The tail is naked, black at the base, white towards the tip. The head and body measure 12 to 14 inches, the tail 9 to 10 and the weight is from 2 to $2\frac{1}{2}$ lbs.

"Quite plentiful round Bankachon but extremely local. The habits of *Gymnura* when known make it a fairly easy animal to look for.

At Bankachon they frequented the neighbourhood of the small forest streams, which flow from the hills into the Pakchan river, but apparently only near their sources, before they entered the Mangrove Swamps and became tidal. Their tracks, which were never at any distance from water, were very easy to find, being most numerous up and down the sandy, half dry beds of these streams. As a rule, most small mammals seem to prefer the edges to the sodden, dark interior of evergreen forests, but the tracks of *Gymnura* were only found where the streams flowed through the very depth of the jungle. Their hiding places were sometimes among the overhanging roots of trees near the stream, or else in holes like those of bandicoots, which had evidently been excavated by themselves.

When caught alive *Gymnura* is extremely savage, and bites at anything within reach with an accompaniment of snarls and growls. Two of my ferrets were pitted against one of these animals, the *Gymnura*, although

disabled when brought in, held its own for a considerable time, its skin, which is very loose, affording a very poor hold for the ferrets, which received several severe bites. The stomachs of two specimens examined contained remains of cockroaches, crickets, beetles, various larvæ, and a millipede, besides some vegetable matter, consisting of one or two small leaves which had been swallowed entire and the remains of a few small berries.

They are apparently not easily trapped, the present specimens were caught by means of snares, set in their runs and outside their burrows.

While possessing a most objectionable smell, it does not possess the power of ejecting it, as in the Skunk.

During life the long hairs of the back form a narrow compressed crest running from the head to a little beyond the shoulders, and the flattened white hairs have a peculiar soapy feeling. Tail distinctly compressed laterally. The snout is a very sensitive organ and is constantly being twisted about. Ears and bare portions of snout are pink. The villagers of Bankachon value the bones of this animal as medicine.

Weight.— $2\frac{1}{4}$ - $3\frac{1}{4}$ lbs.

Vernacular name.—TIKOS-ANTOO (Malay, Bankachon).”—G. C. S.

(27) PACHYURA Sp.

Shrews.

♂ 1, ♀ 1, Mergui.

“Obtained in the native bazaar, Mergui Town.”—G. C. S.

(28) PACHYURA NUDIPES, Bl.

The Burmese Pigmy Shrew.

1856. *Sorex nudipes*, Blyth, J. A. S. B., XXIV, p. 34.

1888. *Crocidura perrotteti*, Blanford, Mammalia No. 125 (partim).

♂ 1, Banlaw.

This name was established by Blyth on a specimen from Mergui. The skull of the present specimen seems to give slightly larger measurements than those of specimens which we have called *perrotteti* and *hodgsoni*, for example the inner lobe of m^2 measures in antero posterior diameter 0.9 mm., while in the other species it is 0.7 mm. I have therefore adopted the name *nudipes* as at any rate geographically fitting it.

“Taken in thick jungle, close to Banlaw village.”—G. C. S.

(29) GALEOPTERUS PENINSULÆ, Thos.

The Malay Flying Lemur.

1888. *Galeopithecus volans*, Blanford, Mammalia No. 133.

1908. *Galeopterus peninsulæ*, Thomas, A. M. N. H., II., p. 303.

♂ 5, Bankachon.

In 1908 (A. M. N. H., I., p. 252). Thomas dealt with the nomenclature of the whole of the Flying Lemurs, putting them in two Genera, viz.:—*Galeopterus* represented by the Sumatran form *temminckii*, Waterhouse, and *Cynocephalus* represented by *Lemur volans*, L. from the Philippines. Later in the same year (l. c. II., p. 303) he separated the Malayan *Galeopterus* from *temminckii* under the name *peninsulæ*.

This animal seems to bear the same relation to the Tupaias as *Petaurista* does to the smaller squirrels. It measures about 24 inches in length over

all, of which from one-fourth to one-third is tail. It has membranes joining the fore and hind limbs, reaching to the wrist and ankle. Moreover the toes of all four feet are webbed right up to the claws which are sharp and curved, like miniature tiger claws.

"Probably fairly numerous, but not at all an easy animal to find except on moonlight nights, when they may be occasionally seen gliding from tree to tree like a flying squirrel. During the day they hide, often in hollow trees or among thick foliage, always at a considerable distance from the ground, when they are most difficult to find, their matted fur exactly matching the bark of a tree.

Except in flight, their movements are quite unlike those of Flying Squirrels; they move about slowly like a *Loris* and appear to be considerably hampered by their parachutes. The tail, like that of some bats, is usually kept more or less curled up under the body.

There is a gland near the root of the tail, situated in a shallow pouch, which in adults is bright orange in colour and rather sticky, but there is no perceptible smell. During life there is a distinct suffusion of green, especially on the back and upper side of the parachute, which almost disappears when the skin becomes dry. I have remarked a somewhat similar phenomenon in some *Tupaia*s.

The contents of the stomach were entirely vegetable, and appeared to consist of leaves, there were no seeds, nor traces of any kind of fruit.

Ears amber yellow, iris rather light brown.

Weight.— $2\frac{1}{2}$ - $3\frac{1}{2}$ lbs.

Vernacular name.—TUPAI-KARBA (Malay, Bankachon)."—G. C. S.

(30) *FELIS TIGRIS*, L.

The Tiger.

1766. *Felis tigris*, L., Syst. Nat., I., p., 61; Blanford, Mammalia No. 29.

♂ 1, Bankachon.

"Plentiful in Southern Tenasserim. ♂, 7th February 1914, weight 382 lbs., length between pegs $8\frac{1}{2}$ feet. Length of head and body 1,800 mm.; tail 920, hind foot 365, ear 124, height at shoulders to tip of foot 1,035, girth behind shoulders 1,215, girth in front of hind quarters 1,085, girth of neck 705. Tigers are believed to run smaller in Tenasserim than in India and although this specimen would not be above the average for an Indian individual, it is considered very large for these parts.

Vernacular name.—RIMAU (Malay, Bankachon)”—G. C. S.

(31) *FELIS BENGALENSIS*, Kerr.

The Leopard Cat.

(Synonymy in No. 11.)

♂ 2 (juv.), Bankachon; ♀ 1, juv. 1, Mergui Town.

(See also Reports Nos. 14, 15 and 16).

(32) *FELIS*.

Domestic Cat.

♀ 1, Victoria Point.

"This specimen was shot in thick jungle near Victoria Point, and had possibly run wild. In colour it resembles a number of domestic cats observed in the District.

Vernacular name.—KUCHING (Malay, Bankachon)."—G. C. S.

(33) *VIVERRA ZIBETHA*, L.

The Large Indian Civet.

(Synonymy in No. 14.)

♂ 2, ♀ 2, Bankachon; ♂ 1, ♂ 1, Thaget.

"Plentiful, like all the Civets, it is very easily trapped.

Vernacular name (for all Civets)—MUSANG (Malay, Bankachon)."—G. C. S.

(34) *VIVERRA MEGASPILA*, Bl.

The Burmese Civet.

(Synonymy in No. 16.)

♀ 1, Victoria Point; ♀ 2, Tenasserim.

"Very similar in general appearance to *V. zibetha*, except that its head is more massive and has a swollen appearance about the muzzle. It does not smell nearly so strong of Civet as *zibetha*. I have never seen any species of *Viverra* climb a tree, though no doubt well able to do so if they chose.

Weight.—♀, 19 lbs."—G. C. S.

(35) *PARADOXURUS HERMAPHRODITUS*, Pall.

The Malayan Palm Civet.

(Synonymy in No. 16.)

♂ 1, Bankachon; 1, Mergui; ♂ 4, ♀ 2, 1, Tenasserim.

"Plentiful around villages, hiding by day in the roofs of houses.

Weight.—♂, $5\frac{1}{4}$ -6 lbs."—G. C. S.

(36) *PAGUMA LEUCOMYSTAX ROBUSTA*, Mill.

The Tenasserim White-whiskered Palm Civet.

1888. *Paradoxurus leucomystax*, Blanford, Mammalia, p. 114.

1906. *Paradoxurus robustus*, Miller, Proc. Biol. Soc. Wash, XIX, p. 26.

♂ 3, ♀ 2, Bankachon.

The species *P. leucomystax* outwardly closely resembles *P. grayi*, but it has a striking white patch on the face, between the eye and the ear, which differentiates it at a glance.

"Very plentiful inland from Victoria Point, seeming to be even more numerous than *P. hermaphroditus*. In common with all species of *Paradoxurus*, this animal is a great ratter, but unlike the small *Felidæ*, it is seldom particularly destructive to poultry.

Weight.—♂, $12\frac{1}{2}$ lbs.; ♀, $9\frac{1}{4}$ lbs."—G. C. S.

(37) *ARCTOGALIDIA LEUCOTIS*, Horsf.

The Small-toothed Palm Civet.

1881. *Paradoxurus leucotis*, Horsfield, Cat. Mamm., p. 66.

1877. *Paradoxurus prehensilis*, Sclater, P. Z. S., p. 681.

1888. *Arctogale leucotis*, Blanford, Mammalia No. 56.

♂ 2, ♀ 2, in al. 3, Tenasserim.

An animal of the ordinary Palm Civet type, of a pale brown colour with central dorsal stripe (dark brown) and a row of spots of the same colour on each side of it. The tail is long and thin, coloured like the back at its base gradually darkening to that of the dorsal stripe. The type locality is Tenasserim.

"These specimens were shot by moonlight in trees round Tenasserim Village. Thoroughly arboreal and in appearance a typical small sized paradoxure, but more slender and lightly built. The stomachs of specimens examined contained remains of squirrels. Though no doubt to some extent frugiverous, all the Palm Civets live largely on squirrels and are a considerable factor in keeping down the numbers of squirrels which are so destructive to the Cocoanuts.

Weight.— $4\frac{1}{2}$ lbs."—G. C. S.

(38) HEMIGALUS DERBIANUS INCURSOR, Thos.

The Banded Palm Civet.

- 1830. *Viverra hardwickii*, Gray (preoccupied).
- 1837. *Paradoxurus derbyanus*, Gray, Charl. M. N. H., I., p. 579.
- 1837. *Paradoxurus zebra*, Gray (l. c.).
- 1838. *Viverra boiei*, Mueller, Tiddsch. Nat. Ges., V., p. 144.
- 1888. *Hemigale hardwickei*, Blanford, Mammalia, p. 117.
- 1915. *Hemigalus derbianus incurzor*, Thomas, Journ., B. N. H. S., XXIII, p. 613.

About the size of *P. hermaphroditus*. It has close, short fur of a buffy grey colour marked with a black longitudinal stripe running from each ear backwards, to meet a broader transverse band across the shoulders. Behind are 4 or 5 more broad transverse black stripes on the back, the tail also being banded black. It has in fact the same colour pattern as *Prionodon maculosus* but *Hemigalus* is twice the size of that animal.

"Apparently not at all plentiful. The Malay villagers at Bankachon had no name for it. It has absolutely no smell. Tongue very rough, much more so than in other small carnivores. Probably one of the most active of all viverrine animals, and without doubt largely arboreal. When caught alive it is very savage and growls like a cat.

Weight.—♂, 4-5 lbs."—G. C. S.

(39) ARCTICTIS BINTURONG, Raffles.

The Cat Bear.

- 1822. *Viverra binturong*, Raffles, Linn. Trans., XIII, p. 253.
- 1888. *Arctictis binturong*, Blanford, Mammalia.

2 (no skulls), Tenasserim.

"These two skins were obtained by natives near Tenasserim Village. It seems to be an uncommon animal and was not recognised by many of the inhabitants."—G. C. S.

(40) MARTES FLAVIGULA PENINSULARIS, Bonh.

The Malay Marten.

- 1888. *Mustela flavigula*, Blanford, Mammalia No. 77 (partim).
- 1901. *Mustela flavigula peninsularis*, Bonhote, A. M. N. H., VII, p. 346.

♀ 2, Bankachon.

Bonhote dealt with this group of Martens in 1901 (l. c.) He distinguished the present form from true *flavigula* by its naked soles; its pale colour across the shoulders distinguishing it from the more southern form (Sumatra, Java, Borneo).

"These two specimens were shot together high up in a tree in thick forest. Without doubt more or less diurnal, as these specimens were evidently hunting. Although not unpleasantly strong, they had the characteristic polecat smell.

Weight.— $4\frac{1}{4}$ lbs.

Vernacular name.—BANGBONE (Malay, Bankachon)."—G. C. S.

(41) PETAURISTA TAYLORI, Thos.

Taylor's Flying Squirrel.

1914. *Petaurista taylori*, Thomas, Journ., B. N. H. S., XXIII, p. 205.

♂ 1 (no skull), Bankachon.

This animal is related to *P. yunnanensis* (cf. Blanford, Mamm. No. 230) and *P. candidulus*, Wroughton, especially to the latter. It is a fairly uniform chestnut all over, the strong grizzling of white, so characteristic of *candidulus*, is limited to a small area on the centre of the back and to the forehead. The base of the tail, unlike that species, is coloured like the back and the black tail tip is almost or quite absent.

"Flying Squirrels often collect in numbers within a small area, often in a single tree in fruit, and although they can move about in a tree fairly actively, they do not travel much when a good feeding place has been found. Usually they keep up their peculiar call intermittently through the night, but here they were never heard calling and we were unable to find any of their feeding trees.

Vernacular name.—KUBUNG (Malay, Bankachon)."—G. C. S.

(42) SCIUROPTERUS (HYLOPETES) BELONE, Thos.

Malay Pigmy Flying Squirrel.

1908. *Sciuropterus (Hylopetes) belone*, Thomas, A.M.N.H., II., p. 305.

♂ 1, Bankachon; ♂ 1, ♀ 1, Tenasserim Village; ♂ 8, ♀ 3, Banlaw.

Sciuropterus belone is very close to *S. spadiceus* from Arakan, and would probably have been lumped with it had Blanford had to deal with it.

"Plentiful in native fruit gardens."—G. C. S.

(43) RATUFA MELANOPEPLA, Miller.

The Tenasserim Giant Squirrel.

(Synonymy in No. 16.)

♂ 1, Victoria Point; ♂ 1, ♀ 2, Bankachon; ♂ 1, ♀ 1, Malawun, ♂ 1, ♀ 2, Thaget.

I dealt to some extent with the distribution of this species in my last Report. From here southwards it is found (varying somewhat locally) all through the Malay Peninsula and the nearer islands of the Archipelago, the representatives of the genus in Java, Sumatra, and Borneo (with their surrounding islands) belong to other species.

"Fairly plentiful, but more difficult to obtain in thick evergreen jungle than in the deciduous forests further north, as in other places these squirrels evidently get rusty coloured during the hot season.

Weight.—3-4 lbs.

Vernacular name.—TUPAI-NANDONG (Malay, Bankachon)."—G. C. S.

(44) SCIURUS EPOMOPHORUS DAVISONI, Bonh.

The Burmese Epaulet Squirrel.

1891. *Sciurus caniceps*, Blanford, Mammalia No. 249 (partim).

1901. *Sciurus epomophorus davisoni*, Bonhote, A.M.N.H., VII, p. 273.

♂ 4, ♀ 2, Victoria Point; ♂ 16, ♀ 25, in al. 2, Bankachon;
♂ 5, ♀ 5, Tenasserim Village; ♀ 2, Tagoot.

Bonhote in his paper (l.c.) limited the range of *Sc. concolor* to the southern part of the Malay Peninsula, and gave the name of *epomophorus* to the form of it referred to by Blanford as having "the sides of the neck and flanks rufous". In *davisoni* these rufous patches have faded to a "yellowish tinge". The type locality is Bankasun, where it was taken by Davison; the bulk of the present series are therefore topotypes.

"Very plentiful everywhere, both around habitations and in the thickest forest. A thickset rather clumsy looking squirrel. Wherever there are plantations this squirrel destroys large numbers of cocoanuts, by drilling a circular hole in the side and extracting the contents.

Weight.—10-14 ozs.

Vernacular name.—TUPAI (Malay, Bankachon)."—G. C. S.

(45) MENETES BERDMOREI, Blyth.

Berdmore's Squirrel.

1849. *Sciurus berdmorei*, Blyth., J. A. S. B., XVIII, p. 603.

1891. *Sciurus berdmorei*, Blanford, Mammalia No. 258.

♂ 3, Bankachon; ♀ 1, Thaget; ♀ 1, Banlaw.

"This species spends most of its time on the ground, occasionally it may be seen running along railings or up and down slanting or broken bamboos, but never at any distance from the ground. At Bankachon it is said to be often found on the edges of rice fields, around Maliwun it was occasionally seen running across tracks and among long grass, and bamboo scrub, especially in the early evenings, but I have also seen it in the thickest forest. It is very like *Tupaia* in its movements, hiding at the smallest noise and not readily making a second appearance.

Weight.—7¼ ozs.

Vernacular name.—QUUAH (Malay, Bankachon)."—G. C. S.

(46) TAMIOPS MACCLELLANDI BARBEI, Blyth.

The Striped Burmese Squirrel.

(Synonymy in No. 14.)

♂ 21, ♀ 13, Tenasserim Village; ♂ 2, Thaget; ♂ 3, ♀ 11, Banlaw.

"Completely arboreal. I have never observed this species actually on the ground. Common around villages on the Tenasserim River but not observed further south. More plentiful in native fruit gardens than in jungle.

Weight.—1½-2 ozs."—G. C. S.

(47) HAPALOMYS LONGICAUDATUS, Blyth.

Berdmore's Rat.

1859. *Hapalomys longicaudatus*, Blyth, J. A. S. B., XXVIII, p. 296.

1891. *Hapalomys longicaudatus*, Blanford, Mammalia No. 269.

♂ 1, ♀ 1, Bankachon.

This rare rat is distinguished from all other Oriental *Muridæ* by the presence of a triple row of tubercles on the lower molars. It is about the size of *E. rufescens*, has a very long tail, four toes on the front feet, and the great toe of the hind-foot flattened, with a broad flat nail, instead of a claw.

"These specimens were discovered, while hunting for *Chiropodomys* among bamboos. They were found inside hollow bamboos at some distance from the ground. Not plentiful and probably entirely arboreal.

Weight.—♂ $3\frac{1}{4}$ ozs.; ♀ $3\frac{1}{8}$ ozs."—G. C. S.

(48) *CHIROPDOMYS PEGUENSIS*, Blyth.

The Burmese Tufted-tailed Tree Mouse.

1859. *Mus peguensis*, Blyth, J. A. S., XXVIII, p. 295.

1891. *Chiropodomys gliroides*, Blanford, Mammalia No. 271 (partim).

♂ 29, ♀ 21, in al. 4, Bankachon.

Blyth first described a member of this genus, which, from its resemblance to the common European Dormouse, he named *gliroides*. The type, a rather damaged specimen, was from Cherrapunji. Four years later he described *peguensis* from Schwegyen. There are no specimens (other than in spirits) of *gliroides* for comparison. As however Blyth reprinted his description of *gliroides* when giving that of *peguensis* I do not feel justified in ignoring the name *peguensis* which geographically must belong to these specimens although I am unable to specify the differences between the two species. I therefore propose the name *peguensis* for Burmese specimens at least until Assam specimens are available for comparison.

Chiropodomys closely resembles *Vandeleuria*, but is more stoutly built and has the terminal 1-3 of the tail furnished with long hairs almost forming a tuft, and has the hallux and rudimentary pollux armed with a flat nail instead of a claw. Its mammary formula is 0-2-4.

"Very plentiful around Bankachon wherever there were bamboos. They never got into traps, even when set among bamboos, but were easy to find as they hid by day, generally singly, occasionally a female and two young, inside the hollow joints of dead bamboos, through one side of which they had bored a circular entrance, about two inches in diameter.

Weight.— $\frac{1}{2}$ -1 oz."—G. C. S.

(49) *EPIMYS SURIFER*, Mill.

The Malay Spiny Rat.

1900. *Mus surifer*, Miller, Proc. Biol. Soc. Wash., XIII, p. 148.

? 1891. *Mus jerdoni*, Blanford, Mammalia No. 279 (partim).

♂ 7, ♀ 12, Victoria Point; ♂ 3, ♀ 1, Victoria Island; ♂ 25, ♀ 24, Bankachon; ♂ 1, ♀ 2, Thaget.

I have entered *Mus jerdoni* of Blanford's Mammalia in the synonymy above, but I very much doubt if Blanford ever saw a specimen of this species. Except somewhat in colour and in its spiny coat *surifer* does not resemble *jerdoni*. It is a large stoutly built rat, with a tail, at most, slightly longer than the head and body. When in new coat it is a bright ochraceous colour, modified a good deal by darker colouring in the back.

"Very plentiful, especially in thick evergreen jungle.

Weight.—4-5 $\frac{1}{2}$ ozs., specimens from Victoria Island averaged more, 5-8 ozs."—G. C. S.

(50) *EPIMYS JERDONI*, Blyth.

The Bicoloured Rat.

(Synonymy in No. 14.)

♂ 1, Victoria Point; ♂ 1, ♀ 2, Bankachon.

I place these specimens under *jerdoni* pending receipt of topotypes from Sikkim, they agree fairly with the individual placed under this name by Miss Ryley in the Shan State's Report.

(51) EPIMYS RUFESCENS, Gray.

The Common Indian Rat.

(Synonymy in No. 1.)

Variety with white underparts—

♂ 26, ♀ 22, Victoria Point; ♂ 4, ♀ 2, Victoria Island; ♂ 8, ♀ 7, Bankachon; ♂ 2, ♀ 3, Maliwun; ♂ 6, ♀ 8, Tenasserim Village; ♂ 3, ♀ 3, Thaget; ♂ 14, ♀ 8, Tagoot; ♀ 1, Banlaw.
(See also Reports Nos. 5, 6, 7, 9, 10, 11, 13, 14, 15 and 16).

“Plentiful everywhere, particularly around houses or near cultivation. The average tail measurements were considerably less than in specimens from Upper Burma, being often less than that of the head and body (although one or two individuals No. 4392, etc., from Victoria Point—probably recently imported specimens—had tails of the normal length). The mammary formula is not always constant, it not being at all uncommon to find uneven numbers—this irregularity was always noticed in the pectoral mammæ.

Weight.— $3\frac{1}{2}$ - $5\frac{3}{4}$ oz.

Vernacular name—TIKOS (Malay, Bankachon) (all rats and mice).”—G. C. S.

(52) EPIMYS CONCOLOR, Blyth.

The Little Burmese Rat.

(Synonymy in No. 16.)

♂ 4, ♀ 1, Victoria Point; ♂ 1, ♀ 1, 9 (not sexed) Maliwun.
♂ 2, ♀ 5, Tenasserim Village; ♂ 3, Thaget.

“Plentiful in the township of Maliwun and Victoria Point, apparently not occurring in the forest village of Bankachon. Entirely a house rat.

Weight.— $1\frac{1}{2}$ ozs.”—G. C. S.

(53) EPIMYS VOCIFERANS, Mill.

The Long-tailed Malay Spiny Rat.

1900. *Mus vociferans*, Miller, Proc. Biol. Soc. Wash. XIII., p. 138.

♂ 3, ♀ 1, Victoria Island; ♂ 2, ♀ 1, Bankachon.

A large rat, (head and body nine inches) with a very long, bicoloured tail (14 inches). Ochraceous colouring resembling that of *surifer*, fur very much less spiny than in that species.

“Plentiful on Victoria Island, the specimens were trapped on rocky ground, in thick forest, close to running water. Those from Bankachon were obtained in similar situations.

Weight.—9-12 ozs.”—G. C. S.

(54) EPIMYS VALIDUS, Miller.

The Large Malay Rat.

? 1891. *Mus bowersi*, Blanford. Mammalia No. 276 (partim).

1900. *Mus validus*, Miller, Proc. Biol. Soc. Wash., XIII, p. 145.

♂ 1, ♀ 1, Thaget.

The type locality is Trong. Though somewhat closely resembling Anderson's *bowersi* externally, it is, as Miller points out, an entirely distinct species, its closest known relative being apparently *infraluteus*, Thos. from Borneo.

Blanford gives Karennee and Tenasserim in the distribution area of *bowersi*, but so far we have no evidence of its having been taken so far south. It is possible the *M. bowersi* taken by Fea were the present animal.

"Occurring in bamboo jungle around Thaget, but apparently not at all plentiful."—G. C. S.

(55) GUNOMYS VARIUS, Thos.

The Malay Mole Rat.

1908. *Gunomys varius*, Thomas, A. M. N. H., XX., p. 204.

1891. *Nesocia bengalensis*, Blanford, Mammalia No. 295 (partim).

♂ 1, ♀ 1, Mergui.

The type locality is Penang.

"Very plentiful on Mergui Island, especially in native bazaars and around stoves."—G. C. S.

(56) RHIZOMYS CINEREUS, Maccl.

The Large Bamboo Rat.

(Synonymy in No. 14.)

♂ 5, ♀ 12, Tenasserim; ♂ 3, ♀ 1, Thaget; ♂ 2, ♀ 2, Banlaw.

"Very plentiful on the Tenasserim River. Always found in bamboo jungle, the roots of which plant they seem to feed on exclusively, and around which they make their burrows. Although frequently burrowing from one clump of bamboo to another, they do not travel to the same extent underground, nor make the same long, mole like, tunnels with frequent mounds of earth, as the smaller species of *Rhizomys*.

Weight.—6-8 lbs.

Vernacular name.—DEKKAN (Malay, Bankachon)."—G. C. S.

(57) ACANTHION BRACHYURUS, L.

The Malay Porcupine.

(Synonymy in No. 16.)

♂ 1, ♀ 1, skull only 1, Bankachon; ♂ 2, Tenasserim.

It seems to me possible, and even probable, that when we obtain authentic specimens of *Hystrix bengalensis*, (there is no specimen in the National Collection) we shall find it is identical with or closely related to the present animal. 'Acanthion' has been generally treated as neuter but this is wrong, the Greek word is masculine.

"Quite plentiful, destructive when they get amongst rubber plantations. The few porcupine earths observed were single burrows, no colonies were found.

Weight.—♂ 32 lbs.; ♀ 27½ lbs.

Vernacular name—LANDAK (Malay, Bankachon)."—G. C. S.

(58) ATHERURUS MACROURUS, L.

The Malay Brush-tailed Porcupine.

1765. *Hystrix macroura*, Linnæus, Syst. Nat., p. 77.

1801. *Hystrix fasciculata*, Shaw, Gen. Zool., II., p. 11.

1891. *Atherura macrura*, Blanford, Mammalia No. 318

♂ 1, Bankachon.

Somewhat resembling the ordinary porcupine, but lacking all signs of a crest, and having a comparatively long tail, ending in a brush or tassel of modified spines.

"Fairly plentiful everywhere, though less so than *Acanthion*. A colony exists in a semi-tame state on Mergui Island, where they are fed and protected by 'Hypongyis'. Apparently quite similar in habits to *Hystrix* and *Acanthion*.

Weight.—9 lbs. (immature).

Vernacular name—LANDAKKECHIL (Malay, Bankachon)."—G. C. S.

(59) *TRAGULUS NAPU*, F. Cuv.

The Large Malay Chevrotain.

1822. *Moschus napu*, F. Cuvier, Hist. Nat. Mamm., pl. 329.

1891. *Tragulus napu*, Blanford, Mammalia No. 373.

♂ 13, ♀ 11, Bankachon.

Geographically these should be the *T. canescens* of Miller but differ so markedly in several characters from his description that I prefer to retain the older name.

The Malay Chevrotain closely resembles the Indian Chevrotain in form and size, but differs altogether in colour. Above it is a buffy-brown with a well marked black stripe commencing on the crown and running down the back of the neck. Below it is white, with two diverging and broadening dark stripes, which run backwards down the throat till they meet a somewhat paler collar at the base of the throat.

"Practically swarming, equally with *ravus*, in the jungles round Bankachon, but not occurring further north, on the Tenasserim River. They are easily caught in numbers by means of spring snares set in gaps of an artificial 'brake' of cut brushwood, constructed for the purpose. It is however impossible to make a big bag by shooting, as they are so skulking in their movements that it is difficult to get a sight of them without an organised beat. Although chiefly nocturnal, I have occasionally seen animals of both these species crossing a track in the daytime, a thing never witnessed with *meminna*, in Southern India.

The sharp tusks possessed by the males, which are considered to be poisonous by the natives of Java and S. India, are perhaps used as a defence against small carnivores, when caught they did not try to use them however, but merely kicked and struggled like a rabbit. When caught they will often scream like a hare, and frequently died suddenly in their struggles to escape from a net.

The throat gland in both species was always covered with a clear, rather sticky substance, that exuded in small beads, it was however quite odourless. In adults these glands are often much swollen. The female is the heavier.

Weight.—8-12 lbs.

Vernacular name.—NAPU (Malay, Bankachon)."—G. C. S.

(60) *TRAGULUS KANCHIL RAVUS*, Mill.

The Little Malay Chevrotain.

1891. *Tragulus javanicus*, Blanford, Mammalia No. 372.

1902. *Tragulus ravus*, Miller, Proc. Biol. Soc. Wash., XV., p. 173.

♂ 14, ♀ 9, Bankachon; ♀ 1, Mergui; ♀ 1, Thaget.

Miller's *T. ravus* was based on specimens from Trong. They are distinctly paler than Sumatran specimens but there is considerable variation

in all the characters. I prefer to rank them as a geographical race of *kanchil*.

Blyth's *T. fuscatus* and *T. pelandoc*, based on stuffed specimens without locality, are impossible of determination.

This animal much resembles the last in all but size, *T. napu* being very much the larger.

"Very plentiful round Victoria Point but more local and much less numerous further north, on the Tenasserim River. Identical in habits with *napu*.

Weight.—4-5 $\frac{3}{4}$ lbs.

Vernacular name.—PLANDOK (Malay, Bankachon)."—G. C. S.

(61) MUNTIAUS GRANDICORNIS, Lyd.

The Tenasserim Rib-faced Deer.

1891. *Cervulus muntjac*, Blanford, Mammalia No. 362.

1904. *Cervulus muntjac grandicornis*, Lydekker, Field, CIV, p. 780.

♂ 1, Bankachon; ♂ 3, ♀ 2, Tenasserim; ♂ 3, ♀ 3, in al. 1, Thaget; ♂ 2, ♀ 1, (skull only) Banlaw.

"Plentiful everywhere, but especially so in the bamboo jungles round Thaget."

Vernacular name.—KIJANG (Malay, Bankachon)."—G. C. S.

(62) RUSA UNICOLOR, Bechs.

The Sambhar.

(Synonymy in No. 5.)

♀ 1, Tenasserim; ♀ 1, Thaget; ♀, Banlaw.

(See also Reports Nos. 11 and 15.)

"In adult Sambhar of both sexes, the lower part of the throat always appears to be bare, while in the centre of this bare area there is a small spot always more or less inflamed. The absence of hair is probably due to the animal rubbing its throat against trees on account of the irritation caused by this curious disease or parasite, it certainly has not the appearance of a gland.

Vernacular name.—RUSA (Malay, Bankachon)."—G. C. S.

(63) RHINOCEROS SUMATRENSIS, Cuv.

The Asiatic Two-horned Rhinoceros.

1817. *Rhinoceros sumatrensis*, Cuv., Regne An. 1, p. 240; Blanford, Mammalia No. 336.

1854. *Rhinoceros crossei*, Gray, P. Z. S., p. 251.

1873. *Ceratorhinus niger*, *C. blythii*, Gray, A. M. N. H., XI, pp. 357-360, pl. XI.

♀ 1, near Bankachon.

"Measurements of sp. 4714, ♀, shot near Bankachon, 17 miles inland from Victoria Point, Southern Tenasserim, 7th January 1914.

- | | | | | | |
|-----|--|---------|-------|-------|-----|
| (1) | Extremelength—tip of nose—up and down horns to tip of tail | .. .. . | .. | 3,265 | mm. |
| (2) | Tip of nose to root of tail—up and down horns | .. | 2,600 | .. | .. |
| (3) | Tip of nose to root of tail <i>not</i> up and down horns | .. | 2,520 | .. | .. |
| (4) | Length of tail | .. .. . | .. | 665 | .. |

(5)	Hind foot—from hock to tip of longest nail	420	mm.
(6)	Ear	175	„
(7)	Length of head—tip of nose to between ears—up and down horns	760	„
(8)	Length of head—tip of nose between ears— <i>not</i> up and down horns	680	„
(9)	Height from shoulder to tip of longest toe	1,440	„
(10)	Height of withers to tip of longest toe	1,530	„
(11)	Length of anterior horn—around front curve ..	130	„
(12)	Girth of neck—half way between head and shoulders..	1,095	„
(13)	Girth behind shoulders	2,145	„
(14)	Girth in front of hind quarters	2,290	„
(15)	Girth of fore foot	550	„
(16)	Girth of hind foot	538	„
(17)	Girth of fore leg half way above the knee	565	„
(18)	Girth of hind leg half way above hock.. ..	525	„

Iris, dark brown.

Insides of ears, lips, lower throat, and under part around limbs tinged with dull flesh colour.

General colour slate black, although appearing lighter during life owing to a thin and probably permanent coating of dry mud.

Skin folds not very marked though easily felt, particularly on the shoulders. Tail very much compressed laterally at end.

(For full particulars of the shooting of this rhinoceros, see Miscellaneous Note No. VI).

Vernacular name.—KYAN-CHYAW (Burmese), BADA-K-RYIA (Malay Bankachon).”—G. C. S.

(64) *SUS JUBATUS*, Mill.

The Tenasserim Wild Pig.

1891. *Sus cristatus*, Blanford, Mammalia No. 374 (partim).

1906. *Sus jubatus*, Miller, Proc. U. S. Nat. Mus., XXX, p. 746.

♂ 3, ♀ 1, Bankachon.

This undoubtedly represents Miller's *S. jubatus*. The type of that species was from Trong, Lower Siam, but out of 13 specimens examined by him all but two were from Tenasserim. Blanford in his remarks (l.c.) says “According to Blyth the Tenasserim wild pig is a much smaller form than *S. cristatus* of India.” The present is no doubt the animal referred to. I can find no specific difference between the ‘red’ and ‘black’ specimens. All are immature, and from the material here available the only possible conclusion is that the colour is an age or sex character or partly both.

“Wild pigs are plentiful inland from Victoria Point. Around Maliwun two varieties are recognised both by resident Europeans and Natives.

Vernacular names.—BABI or BABI-UTAN (Malay, Bankachon).”—G. C. S.

SUPPLEMENT.

The following, included in this Collection, belong to the Dry Zone fauna dealt with in the last Report:—

1. *FELIS AFFINIS*, Gray.

5230, Tagyigin, Gudalin; 5231, Yin, Rani (Dist. Commissioner, Lower Chindwin).

2. VIVERRA ZIBETHA, L.

5228, Yin, Rani Township (Dist. Commissioner, Lower Chindwin).

3. PARADOXURUS HERMAPHRODITUS, Pall.

5226, (Dist. Commissioner, Lower Chindwin).

4. CANIS INDICUS, Hodgs.

5227, Kontha Jungle, Yin (Dist. Commissioner, Lower Chindwin).

5. PETAURISTA CANDIDULUS, Wrought.

5205, Paga, Neni (Dist. Commissioner, Lower Chindwin).

6. RATUFA MELANOPEPLA, Mill.

5036, Myingyan (D. G. Robertson, I.C.S.).

7. SUS sp.

5232. Skull of an old boar from the District Commissioner, Lower Chindwin. It would be interesting to know if it is indubitably that of a Wild Pig, it seems to show considerable differences from *cristatus* on the one hand and *jubatus* on the other.

The following from the Arakan Yomas and Chin Hills belong to an area from which I hope later we shall obtain collections.

1. *Presbytis phayrei*, Bl., 5037. Arakan Yomas (E. V. Eddis, I. F. S.).
2. *Paradoxurus hermaphroditus*, Pall., 4727, Chin Hills (Capt. W. I. J. Massey).
3. *Mungos urva*, Hodgs., 5254, Chin Hills (Capt. Massey).
5. *Sciurus locroides mearsi*, 4726, no skull, Chin Hills (Capt. Massey).
6. *Epimys spp.*, indeterminable, 4667, 4668, 4669, no skulls, Chin Hills (Capt. Massey).
7. *Rhizomys sp.*, 4666, no skull, Chin Hills (Capt. Murray). This is probably *R. badius*.

The specimen No. 5253 is *Capricornis milne edwardsi*, David. It is from the N. Shan States, 50 miles East of Maymyo and belongs to the fauna dealt with in Report No. 14.

Finally the following are from Central Burma where our Collectors have not yet worked:—

- Scotophilus wroughtoni*, Thos., 5256, Pyinmana (T. A. Hauxwell, I.F.S.).
Myotis (Leuconoe) adversus, 5252, Rangoon.
Felis temmincki, Vig. & Horsf., 5255, juv., no skull, Pyinmana.
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“CAGRI” AND “NUL,” HESSAMARA: SUBANSIRI “CHURS.”

Haunts of *Paradoxornis flavirostris*, *Pyctorhis altirostre*, *Pellorneum palustre*,
Drymochares hyperythra, &c., &c.



CLEARANCE IN VIRGIN FOREST, BASE OF DAPHLA HILLS, NORTH LAKHIMPUR.

THE BIRDS OF UPPER ASSAM.

NOTES ON THE BIRDS OF UPPER ASSAM.

BY

H. STEVENS, M. B. O. U.

Part III with Plate IV.

359. *Crocopus phanicoptera phanicoptera* (Lath.) [1271].—Bengal Green Pigeon.

Occurs sparingly in the Dibrugarh district. No records for North Lakhimpur. Specimens secured around Rungagora in December, January, April, June. The plumage of this family is a beautiful example of harmonious blending of diverse colours and an excellent case of protective coloration.

360. *Treron phayrei phayrei* (Blyth.) [1273].—Ashy-headed Green Pigeon.
Osmotreron phayrei, Blanford, F. B. I., Vol. iv., p. 8.

Osmotreron pompadora phayrei, Baker, Indian Pigeons, p. 27.

Very plentiful in the plains; the common Green Pigeon around Rungagora, specimens collected in August, October, December, January. Green Pigeon after the nesting season "flight" in considerable numbers to and from their favourite trees when the berries are ripe. The local sportsmen amongst the planting community take advantage of this habit and take up positions in the open spaces they are wont to pass over particularly at late afternoon and evening; as they fly with great rapidity and dip when leaving and rise when approaching the forest, they afford excellent shooting. Before sunset they delight in roosting amongst the foliage of the topmost branches. So well does their plumage assimilate with their surroundings, it is only with the greatest difficulty they can be located. It is a pleasing sight to hear and see these birds when feeding as they hustle each other for the possession of the coveted berries.

Iris blue, outer ring pale red or pink; orbital skin plumbeous; bill light blue, at base dark; tarsus pinkish-red; claws horny.

361. *Treron bicincta bicincta* (Jerdon.) [1278].—The Orange-breasted Green Pigeon.

Osmotreron bicincta domvillii, Baker, Indian Pigeons, p. 49.

Sparingly distributed in the plains, plentiful at the base of the hills in North Lakhimpur. Specimens collected at Rungagora in June. Dejoo, June and July; North Lakhimpur, April. It has a pleasing low subdued gurgling note. In first week in June numbers would come at morning and evening to a Seleng tree (*Sapium baccatum*) adjacent to bungalow. Iris blue, outer ring pink; bill pale blue; tarsus deep reddish-mauve; claws dark horny blue.

362. *Treron nipalensis* (Hodgs.) [1281].—Thick Billed Green Pigeon.

Occurs at the base of the hills in North Lakhimpur. No records for the Dibrugarh district in the plains. North Lakhimpur, June; Joyhing, May. Iris pink with an inner ring bluish-brown; orbital skin pea-green or emerald green; bill: basal half dark coral red or waxy red, rest of bill pale horny green or greenish-yellow; tarsus, coral red, or lake red; claws horny with dark markings.

363. *Sphenocercus apicauda* (Blyth.) [1282].—Pin-tailed Green Pigeon.

Sphenocercus apicicauda, Blanford, F. B. I., Vol. iv., p. 16.

Plentiful at the base of the hills in North Lakhimpur and commonly occurs in the plains during the cold season. Specimens secured at Rungagora

in February, March (April, 6-4-02, very numerous), June; Dejo, June, July; Seajuli, November.

Iris blue, outer ring light red or pale brown; orbital skin light purplish-blue or light blue; bill light blue at base, tip greenish-horny; tarsus bright red; claws horny.

364. *Carpophaga aenea* (L.) [1284].—Green Imperial Pigeon.

Plentiful throughout the whole district. Rungagora, December, January; North Lakhimpur, July; Seajuli, November; Silonibari, 14-7-11*, numbers crossing between the forest tracts.

365. *Carpophaga insignis insignis*, Hodgs. [1286].—Hodgson's Imperial Pigeon.

Plentiful at the base of the hills in North Lakhimpur. Specimens secured in June. Large parties frequent their favourite trees when the berries are ripe. Iris greyish-white; orbital skin pale grey; bill fleshy red, horny at tip; tarsus reddish-mauve; soles dull yellow; claws horny.

366. *Chalcophaps indica* (L.) [1291].—Bronze-winged Dove.

Occurs throughout the plains, invariably found near water in forest both in the hills and plains, sometimes occupies secondary scrub growth intersected with dusty paths about which it delights to pick up and forage for different seeds.

Iris brown; bill: basal portion reddish-plumbeous, other portion light vermillion or reddish-horny; orbital skin plumbeous red; tarsus purplish-red or dark red, gradually deepening into plumbeous red at claws, the latter horny.

367. *Columba puniceus*, Blyth. [1302].—Purple Wood Pigeon.

Alsocomus puniceus, Blanford, F. B. I., Vol. iv., p. 38; Baker, Indian Pigeons, p. 176.

Fairly plentiful in the plains, probably locally distributed, occurs at times in small parties in forest. A nest containing a single egg taken out of a low tree on 29-6-03, Rungagora. Parent birds secured, also obtained in November.

Iris greyish-white; orbits grey brown; bill reddish-plum, pale at tip; tarsus and claws purplish-lake; soles whitish-brown.

368. *Streptopelia turtur orientalis* (Latham) [1304].—Rufous Turtle-Dove.

Turtur orientalis, Blanford, F. B. I., Vol. iv., p. 40.

Common throughout the plains, partial to forest clearings, and the forest along the banks of the rivers. Rungagora, December, January; Dejo, July.

369. *Streptopelia suratensis suratensis* (Gm.) [1307].—Spotted Dove.

Turtur suratensis, Blanford, F. B. I., Vol. iv., p. 43.

Extremely common and familiar everywhere in cultivated tracts.

370. *Streptopelia tranquebarica tranquebarica* (Herm.) [1311].—Red Turtle-Dove.

Enopopelia tranquebarica, Blanford, F. B. I., Vol. iv., p. 47.

Extremely locally distributed, possibly migratory. The following localities and dates are the only available records:—

Panigaon: Komolabari, North Lakhimpur road, latter end of April 1903, a pair seen. Rungagora, 1-6-04, ♂; 6-6-03, ♂; 7-6-03, ♂; a single occurrence at Dejo, base of hills, and reported once from Joyhing.

371. *Macropygia tusalia tusalia* (Hodgs.) [1312].—The Bar-tailed Cuckoo Dove.

Descends the gorges of the hills on the north frontier in North Lakhimpur at the cold season, extends into the plains sparingly. One secured

in a forest glade opposite Gurijan, right bank R. Dibru; Rungagora, 26-1-02, ♂; Laluk, Bodutti, North Lakhimpur road, 11-2-10*; Dejoo-Silonibari forest track "putti" near the former place, 12-2-10.*

372. *Pavo cristatus cristatus* Linn. [1324].—Common Peafowl.

Recorded by Blanford as inhabiting the whole Assam valley to Sadiya. In Mangaldai and above Gauhati in Lower Assam apparently yet occurs in fair numbers. Its present status in Upper Assam is very obscure. No reliable records even at second hand. In all probability almost extinct. Mr. J. Lindsay Alexander recollects a pair occupying the precincts of Bordeobam many years ago. This Peafowl is of course well known to the Assamese by their name of "Moir." Should it still exist in Lakhimpur the vast expanses of grass land interspersed with Simal near the Bramapootra and on the Majuli in Sibsagar should be its most likely remaining strong-hold.

373. *Polyplectrum chinquis* (Müller) [1327].—The Grey Peacock-Pheasant.

Extends along the base of the hills on both sides of the valley though only occupies the level land, a very short distance from the hills, where the dense vegetation coupled with the broken ground, afford it all the desired protection. It does not however reach beyond the foot hills nor over the watershed on the hills on the north frontier. Reported at Margherita as extending into the plains on this south side as far as Hookunpukri. In North Lakhimpur occurs as far out as Laluk. Its call may be described by the syllable "hu" rapidly repeated in a loud tone about seven times. They are more frequently heard than seen as it requires infinite patience and toil to get anywhere near them in their almost impenetrable haunts.

374. *Gallus gallus* (L.) [1328].—The Red Jungle-fowl.

Gallus ferrugineus, Blanford, F. B. I., Vol. iv., p. 75.

Plentiful throughout the whole district. In North Lakhimpur its numbers apparently vary with the years. A dry period at the time of nesting seems favourable to an increase in their numbers, specimens secured at Rungagora, March; Dejoo, May, July, October*, November* and December (Young birds secured in July); Gogaldhubie, December; Seaguli, November; Dejoo, 15-5-07*, female with chicks in forest; Komolabari to North Lakhimpur, 19-9-11, hens cackling along this road in the adjacent forest.

375. *Gennæus horsfieldi* (Gray) [1339].—The Black-breasted Kalij Pheasant.

Throughout the whole plains in forest and extends over the watershed in the hills on the North Frontier, Margherita, Rungagora, Dejoo, Beni, Abor-Miri hills, Panchnoi, Daphla hills low elevations. ♂: Iris light brown; orbital skin bright crimson; bill greenish-horny; tarsus slaty grey or bluish-slaty.

376. *Bambusicola fytchii* Anders. [1352].—The Western Bamboo-Partridge.
Occurs above Margherita in the north-east corner of the valley.

377. *Excalfactoria chinensis* (L.) [1354].—The Blue-breasted Quail.

Dejoo, North Lakhimpur, 11-12-07, ♀; 19-4-10*, flushed from low land, August 1910 in heavy grass on roadside; 14-9-10, ♂*; Silonibari, 18-7-11, ♂ ♀*; 6-9-11*, on roadsides; 12-9-11*, adults with two chicks. Somewhat overlooked. Resident as a breeding species, sparingly distributed; the above records are from gardens at the foot of the hills.

378. *Coturnix coromandelicus* (Gm.) [1356].—The Black-breasted Quail.

No specimens secured but a large Quail seen on the following occasions could only have been this species if not *Coturnix coturnix*, L:—

Dejoo, North Lakhimpur, 13-2-08*, two pairs; 17-4-08*; 2-3-10*, single.

379. *Arboricola rufogularis rufogularis* Blyth. [1363].—Blyth's Hill Partridge.

Arboricola rufogularis, Blanford, F. B. I., Vol. iv., p. 126.

Occurs in the Daphla hills and Abor-Miri hills on the North Frontier. Specimens secured in January and February.

Iris red-brown; bill black; tarsus salmon red; claws horny.

380. *Arboricola atrogularis* Blyth. [1365].—The White-cheeked Hill Partridge.

Arboricola atrigularis, Blanford, F. B. I., Vol. iv., p. 127.

Throughout the plains and extends up the lower ranges or foot hills of the Daphla and Miri country on the north frontier. Replaced on the watershed and in the valleys on the north by *A. rufogularis*. Its distribution as given by Blanford, Assam; south of the Bramapootra, is considerably extended.

381. *Francolinus gularis* (Temm.) [1376].—The Swamp Partridge.

"Hoi Koli" Miris of the plains, Assam.

Confined to the "churs" adjacent to and in the beds of the large rivers. Komolabari, Dibrugarh, Gosaigaon; Dunsirimukh, Bramapootra; "cagri" Hessamara, Subansiri. Frequents the heavy grass "chopras" and reeds, and roosts in these latter haunts from about eight to twelve feet from the ground. Bill black; iris crimson; tarsus orange yellow; claws horny.

382. *Turnix pugnax* (Temm.) [1382].—The Bustard Quail.

Resident: commonly occurs throughout the plains. Dejoo, February, April, May, September. Dejoo, February 1909, to be met with in numbers in the short grass along the road sides in the garden. My dogs have become quite experts in ferreting them out, but never manage to catch any. I never remember seeing such a quantity, but it is a plentiful bird at most times. Their eggs are constantly brought in when cultivation is in progress. Iris stone white in birds of the year, 10-8-11.

Numerous clutches of three and four eggs taken in April, May, June and July.

383. *Rallina superciliaris* (Eyton) [1395].—The Banded Crake.

Dejoo, North Lakhimpur, 31-5-10*, this morning a pair of these Crakes were located in a "jan" or stream in the garden. My arrival took them by surprise as they were only a few feet away. One took to wing and settled a short distance off in the water again, whilst the remaining bird scurried along the weeds at the water's edge eventually swimming in true rail fashion when it afforded me a fine display of its upper chestnut coloration. Several attempts to locate this pair later on in the day were made without success. The day previous was very hot, rain had fallen at early morning: perfect ideal conditions for water birds. Not previously recorded for Assam.

384. *Limnobænus fuscus* (L.) [1398].—The Ruddy Crake.

Amaurornis fuscus, Blanford, F. B. I., Vol. iv., p. 170.

Bhimpoora bhil, Gogaldhubie, 11-1-05, ♂, secured at early morning when a dense fog hung over the water in the heavy reeds along the banks of the "bhil"; Dejoo, 22-5-10*, one crossed the road a few yards ahead between some "hoolahs" or swampy recesses in the garden. These two occurrences constitute the only records, probably overlooked owing to its skulking habits. Iris vermilion red; orbital skin salmon red; bill dark olive, upper mandible and tip of lower mandible dark; tarsus salmon red; claws pale horny black.

385. *Amaurornis phænicura chinensis* (Bodd.) [1401].—The White-breasted Water-hen.

Amaurornis phænicurus, Blanford, F. B. I., Vol. iv., p. 173.

One of the most common Water-hens, to be found everywhere throughout the plains in marshy or low-lying ground. Clutches of five and six eggs taken in May, June and July. Iris red-brown; bill sap green; frontal shield red or greenish brown; tarsus dark yellow or yellowish-olive; claws horny.

386. *Gallinula chloropus orientalis*, Horsf. [1402].—The Eastern Moor-hen.

Gallinula chloropus, Blanford, F. B. I., Vol. iv., p. 175.

Equally as common as *A. phænicura*, but is more confined to the open sheets of water "bhils" and streams "jans."

Iris red; bill orange red; tip yellow; tarsus green with a tinge of yellow and red above joint.

387. *Gallicrex cinerea* (Gm.) [1403].—The Water Cock.

Distributed in suitable localities throughout the plains.

Dejoo, 3-12-08, ♀*, actually flushed out of grass on road during a dry spell of weather. *Fulica atra* must undoubtedly occur though I have personally overlooked it.

388. *Porphyrio poliocephala* (Lath.) [1404].—The Purple Moor-hen.

"Kham serai," Assamese.

Specimens collected at Bhimpooora bhil (Gogaldhubie) in North Lakhimpur, no doubt occurs on the most of the large "bhils." Iris red brown; bill reddish horny of various depths; tarsus pale pinkish-horny.

Heliopais personata (Gray) has been recorded in recent years from Upper Assam.

389. *Megalornis antigone antigone* (L.) [1409].—The Sarus.

Grus antigone, Blanford, F. B. I., Vol. iv., p. 188.

Recorded by Blanford "eastward as far as Lakhimpur in Assam." Mr. J. Lindsay Alexander was well acquainted with this crane and the Assamese know it by the name of "Khur-sang". Repeated enquiries and every opportunity made use of on frequent journeys up and down the Subansiri from Dhunsirimukh to Boduti have failed to produce any satisfactory evidence of its occurrence though the "serang" led me to understand it is seen at times on this river's banks.

390. *Sypheotis bengalensis* (Gm.) [1417].—The Bengal Florican.

More plentiful in Lower Assam, several seen near Tezpur, February 1910. In the upper limits of the province confined to the vast expanses of grass land, particularly on the north bank of the Bramapootra in the vicinity of Sadiya (Lali Chopra), one secured at Rungagora, 29-2-04, ♀. Records from Nokhroy, Panitola, Kharjan, but only a very few birds turn up at these localities on odd occasions.

391. *Esacus recurvirostris* (Cuv.) [1419].—The Great Stone Plover.

"Baligura," Miris of the plains, Assam.

Confined to the sandy beds of the large rivers in the plains. Rungagora; R. Dibru, rare, 3-12-03, single, 8-2-04, ♀; Hessamara, Subansiri, 7-1-06, ♀; Boduti, 13-1-11, several pairs seen together. Mr. J. L. Alexander found a clutch of two eggs near Derpai on the Subansiri on 23-10-05, which hatched out on 13-11-05. Two clutches of two eggs, each found at Hessamara on the Subansiri, 28-12-05. In one case incubation fresh, in the other inclined to be hard set. This river rises at an earlier period than some of the other rivers which have their source in the nearer ranges probably due to its waters being augmented with the melting snows. This factor may account for the various waders and terns which nest in its bed accommodating them-

selves to these conditions and it is not affected to the same extent with local cold weather rain. Sudden rises are however known at this period and point to rain in its higher limits. At such times a slight increase in its level above its normal cold weather condition plays havoc with nesting birds.

392. *Glareola lactea*, Temm. [1427].—The Small Indian Pratincole.

Commonly occurs on the Runganuddie in North Lakhimpur and no doubt on many of the other rivers. In May it frequents the stony patches in the bed of the river, as it debouches into the plains, for nesting purposes, some seen flying at a high altitude this evening. Dejo, 14-11-10, a slight rise in the river is quite sufficient to cause a considerable loss of their eggs as they lay their eggs at no great distance from the water. Two birds secured on 8-5-04 contained eggs in oviduct.

393. *Metopidius indica* (Lath.) [1428].—The Bronze-winged Jacana.

Plentifully distributed in all swampy localities throughout the plains.

394. *Hydrophasianus chirurgus* (Scop.) [1429].—The Pheasant-tailed Jacana.

Apparently only locally distributed. Seen and procured at Bhimpoorabhil; Gogaldhubie; North Lakhimpur, January 1904, a few pairs only. Several seen on a bhil near Komolabari; Sibsagar, November 1911. 7-1-04, ♂. Iris light brown; bill and tarsus pale olive green.

395. *Sarcogrammus indica indica* (Bodd.) [1431].—The Red-Wattled Lapwing.

Rungagora, R. Dibr, 5-12-03, ♀. Recorded Journal, B. N. H. Socy., Vol. xv., p. 529. This Plover has not been met with since.

396. *Microsarcops cinereus* (Blyth.) [1434].—The Grey-headed Lapwing.

Confined to a few favoured localities during the cold season. Bhimpoorabhil, Gogaldhubie, specimens secured in December. Kharjan bhil, Dibrugarh.

Iris pinkish-brown; bill chrome yellow; terminal half black; orbital ring and wattle yellow ochreous; tarsus similar.

397. *Hoplopterus ventralis* (Wagl.) [1435].—The Indian-Spur winged Plover.

Throughout the plains, frequents both the sandy flats of the sluggish rivers in the plains as well as the stony beds of the hill streams when it is only by its loud call and conspicuous black patches of its plumage visible on rising that it betrays its presence; it has a Lapwing flight. During moonlight nights often to be disturbed from off the roads and open portions of land at some distance from its accustomed haunts when it rises with its usual piercing call. R. Dibr, January; Bramapootra, Komolabari, September; Subansiri, Hessamara, January; Runganuddie, Dejo, 7-1-11, a single and two pairs at evening. R. Dejo, higher reaches, two youngsters running amongst the stones early April 1907. Iris dark brown; bill black; tarsus dark slate (legs reddish-black? Jerdon).

398. *Pluvialis dominicus fulvus* (Gm.) [1439].—The Eastern Golden Plover.
Charadrius fulvus, Blanford, F. B. I., Vol. iv., p. 234.

A cold season visitor, immense parties seen at Gogaldhubie, Bhimpoorabhil, remarkably tame, November 1904.

Panitola Polo Ground, 14-1-02, ♂; Gogaldhubie, 16-12-05, ♂, ♀ ♀; Dejo, 27-8-05, ♂, one of six which put in an appearance on the "maidan" during a phenomenal wet spell; 30-9-07*, five, first appearance; North Lakhimpur, Polo Ground, 3-10-08*, several seen in all probability have been down some days, heavy rain at the time.

399. *Charadrius dubius*, Scop. [1447].—The Little Ringed Plover.

Ægialitis dubia, Blanford, F. B. I., Vol. iv., p. 241.

Occurs on all the rivers throughout the plains and on other large sheets of water in the cold season.

R. Dibru, February, March (April, 15-4-03, ♀); Bhimpooora bhil, Gogaldhubie, December; Subansiri, Hessamara, December; Runganuddie, Dejo, May, 6-5-04, ♂; 31-12-05, ♂. Iris brown; orbital ring yellow; bill black; tarsus dull yellow ochre.

400. *Charadrius placidus*, Gray. [1449].—The Long-billed Ringed Plover.

Ægialitis placida, Blanford, F. B. I., Vol. iv., p. 244.

Procured on the Dibru, Rungagora, 21-12-01, ♀ ♀.

Runganuddie, Dejo, 7-7-04, ♂, a most unusual date in the rains; 10-9-08, ♀, 7-1-11, ♂ ♂, others observed at different dates over a period of several years.

Iris brown; orbits yellow; bill black; tarsus pale pinkish-yellow; claws black.

Both these Ringed Plovers are cold season migrants.

401. *Recurvirostra avocetta*, L. [1452].—The Avocete.

R. Dejo, North Lakhimpur, 7-11-04, ♂. Not recorded by Blanford for Assam. Iris brown; bill black; tarsus slaty blue.

402. *Ibydorhyncha struthersii*, Vigors. [1453].—The Ibis-bill.

Ibidorhynchus struthersi, Blanford, F. B. I., Vol. iv., p. 249.

“Puggah”, Hill Miri.

In North Lakhimpur, at the cold season, to be met with in the beds of the hill rivers and streams, as far as the limits of the fast flowing water, as they are partial to the “gagris” or rapids; occur in pairs or small parties of six to eight individuals; when disturbed they go through the jerky neck movements in a similar manner to most waders and utter a loud wild piping whistle before taking flight which possibly only means a short distance covered with expanded wings half skimming and running over the stony ground. On their arrival these Ibis-bills are extremely tame and loath to leave the river bed by doubling back, they generally fly ahead until the upper confined limits of the river are reached when they have to retrace their flight overhead of necessity; they keep however away from the heavily forested banks. Towards the middle of March they recede into the hills, a near approach then is a difficult matter. They are adept swimmers in the shallow rapid water and a wounded bird will endeavour to dive when pressed.

Blanford’s remark: “descending almost to the plains in winter” is nearer the mark than Dresser who states “wintering in the mountains in spite of the cold.”

R. Dejo, North Lakhimpur, 4-12-04, ♂ ♂, ♀; Runganuddie, Dejo, 11-12-04, ♀, ♂; Joyhing, 1-3-09, ♂; R. Dejo, higher reaches, 18-12-10, ♂, a pair seen; Runganuddie Gorge, 16-2-09 *, a pair; none in evidence on the Runganuddie, 2-4-05; they probably depart the previous month.

R. Dejo ghaut, mid-day, 31-12-10 *, a pair seen; Sifoo or Sifloo R. Subansiri Gorge, 25-2-06 *, a small party; Borburi Rapids, Subansiri, Gorge, 2-2-06 *, a party of six. Records also from Pathalipam and Derpai on the Subansiri. Dirga R. above Seajuli and Joyhing R.

Iris crimson, also brownish-crimson occasionally; bill deep coral red or purplish-red; tarsus pale lavender mauve shading lighter towards toes, pinkish-grey or mauve tinged ochreous; claws black.

Jerdon’s description of the coloration of the soft parts wherever they disagree with those of a competent observer such as Blanford or Godwin

Austen—it is interesting to compare with these—ought to be expunged in a future edition of the Fauna Volumes as they are invariably wrong and misleading.

403. *Numenius arquata* (L.) sub-sp.? [1454].—The Curlew.

Silonibari, North Lakhimpur, 5-9-11, 7-45 a.m., my attention was drawn to the well-known cry of a Curlew overhead. A single bird flying high in a south-westerly direction, sky clear. Commonly seen in the Sunderbuns, Bengal, January 1911.

404. *Tringa hypoleucos*, L. [1460].—The Common Sandpiper.

Totanus hypoleucus, Blanford, F. B. I., Vol. iv., p. 260.

Plentiful along the sandy stretches of the rivers in the plains, although more partial to the stony beds of the hill rivers during the cold season. One record, Runganuddie, North Lakhimpur, 8-5-04, ♂, is a late date.

Iris dark brown; bill greenish plumbeous horny; tarsus greenish-yellow ochre; claws horny.

405. *Tringa glareola*, L. [1461].—The Wood Sandpiper.

Totanus glareola, Blanford, F. B. I., Vol. iv., p. 261.

Never as plentiful as the next Sandpiper, yet commonly occurs in all suitable localities during the cold season.

406. *Tringa ocropus*, L. [1462].—The Green Sandpiper.

Totanus ochropus, Blanford, F. B. I., Vol. iv., p. 262.

Possibly the commonest Sandpiper. Everywhere abundant in marshy ground. The following dates of arrival and departure are worthy of record:—

7-9-11*, Silonibari, four individuals; again 11-9-11*, a single bird; 17-7-10* Dejoo, single bird in a “hoolah” in the garden.

Iris brown; bill dark olive green or dusky green; blackish at tip; tarsus light olive green or dingy green.

407. *Tringa stagnatilis* (Bechst.). [1463].—The Marsh Sandpiper.

Totanus stagnatilis, Blanford, F. B. I., Vol. iv., p. 263.

This miniature Greenshank has been obtained at Bhimpooora “bhil” in North Lakhimpur in December and January.

408. *Tringa nebularia* (Gunner.). [1466].—The Greenshank.

Totanus glottis, Blanford, F. B. I., Vol. iv., p. 266.

Commonly occurs throughout the cold season alike on marshy ground and along the beds of the rivers, at times in small parties of eight to twelve individuals, in general wary, yet this habit varies with the locality as when located on the “sutis” or backwaters of the sluggish forest rivers are usually easy of approach. Its wild call is quite a distinctive feature of the bird life along the river banks. Dejoo, 24-9-10, single bird, flying very wildly, cold wet morning.

Iris brown; bill dark olive brown, darker at tip; tarsus yellowish green.

409. *Erolia temminckii* (Leisl.) [1474].—Temmincks Stint.

Tringa temmincki, Blanford, F. B. I., Vol. iv., p. 275.

Occurs on all the rivers throughout the plains at the cold season.

R. Dibru, December, January, March (April, 16-4-03, ♂); Subansiri, Hessamara, January; Derpai, February; Runganuddie, Dejoo, January. Iris brown or olive brown; bill olive green, dark towards tip; tarsus olive yellow or olivaceous green; claws black.

410. *Scolopax rusticola*, L. [1482].—The Woodcock.

Occurs sparingly at the cold season in the plains. Gurrung Jan Rungagora, 26-1-02, ♂; Dibrugarh, 21-1-06, ♀; Silonibari, 6-1-10*, camped

this evening against the forest. A woodcock came sailing down from the hills at no great height from the ground and settled in the garden; it had been a cold dreary day and it was too late to institute a search.

411. *Gallinago gallinago gallinago* (L.) [1484].—The Common Snipe.
Gallinago caelestis, Blanford, F. B. I., Vol. iv., p. 286.

Rungagora, January, March, April, 6-4-02*; Bhimpooora "bhil", Gogaldhubie, December, January; Dejoo, 20-8-10*, a single bird flushed from low-lying ground in garden.

Dhoolohat, 12-3-11*, eight put up in the garden at mid-day from one quarter; Silonibari, 25-4-11*, a single bird; 7-9-11*, 13-9-11*, four large Snipe disturbed time 7-40 a.m. These observation records refer to this Snipe or *Gallinago stenura*. As no birds were secured it is of course impossible to say with certainty which species. At Bhimpooora "bhil" on hot days these birds could almost be knocked over with a stick so lazily do they rise and in such plentiful numbers although, owing to the swampy nature of the ground, they are almost ungetable. The Jack-snipe *Limnocryptes gallinula* has been reported to me on a few occasions. None have been personally obtained.

412. *Gallinago stenura* (Bp.) [1485].—Pin-tailed Snipe.

Dejoo, 28—29-8-05, ♀ ♀ first arrival of half a dozen birds on the maidan in bad wet weather.

R. Dibru, 13—16-3-03, several secured. Numerous records for intermediate dates; occurs in the stony beds of the hill rivers more frequently than *G. gallinago*.

Iris dark brown; bill brown, black at tip of both mandibles; tarsus bluish slate; claws black.

413. *Rostratula capensis* (L.) [1488].—The Painted Snipe.

Resident; as a breeding species at the base of hills in North Lakhimpur.

Dejoo, North Lakhimpur, 13-6-10, this afternoon during a shower of rain a pair of Painted Snipe passed over the road and settled in a "hoolah" on one side. Eggs taken in this quarter in a slight depression on the ground, 24-6-10, clutch of three, 4-7-10, clutch of two, in both cases incubation fresh; Silonibari, 27-7-10, youngster secured.

414. *Larus ichthyaëtus*, Pall. [1489].—The Great Black-headed Gull.

Joyhing, Runganuddie, 12-3-05, three adults in summer plumage, one ♂ and ♀ secured. Iris dark brown; orbital ring waxy crimson; bill deep yellow orange, latter half with a transverse black mark across both mandibles; tarsus dirty chrome yellow.

415. *Larus brunneicephalus*, Jerd. [1491].—The Brown-headed Gull.

Commonly occurs on the Bramapootra.

416. *Sterna seena*, Sykes. [1503].—The Indian River Tern.

Occurs on both the rivers and large "bhils" although absent from the sluggish rivers in the forest tracts. Nests on the Subansiri at Hessamara where eggs have been taken.

417. *Sterna melanogaster*, Temm. [1504].—The Black-bellied Tern.

Similarly distributed as *S. seena*. Bhimpooora bhil, Gogaldhubie, 15-1-05, ♂ 17-12-05, ♀, have the crown and breast to lower tail coverts black. ♂ 15-1-05, has the crown streaked with black and the lower parts white which cases do not agree with Hume who states "the winter plumage is not assumed to December, and is then only retained for about two months," at least so far as these localities are concerned. Eggs taken at Hessamara on the Subansiri.

Iris brown; bill orange yellow, terminal portion dusty; tarsus orange red; claws black.

418. *Pelecanus philippensis*, Gm. [1523].—The Spotted-billed Pelican.

Occurs in any suitable expanse of water, commonly seen on the Bramapootra and other large rivers. Subansiri below Boduti, 13-1-11, numbers in various stages of plumage; Bhimpooora "bhil," North Lakhimpur, specimens also secured near Dibrugarh, 8-12-02, ♀. Buri bhil in forest near Digiltarung, 10-1-04, ♂.

419. *Phalacrocorax carbo* (L.) sub-sp.? [1526].—The Common Cormorant.

Occurs on all the large rivers in the plains although not so commonly as the next *P. fuscicollis*.

R. Dibru, a "suti" or channel five miles below Rungagora, 9-3-02, adult, white patches on sides of head, neck and flanks very prominent. Subansiri below Boduti, 1-3-10, numbers in small parties.

420. *Phalacrocorax fuscicollis*, Steph. [1527].—The Indian Shag.

The common cormorant on all the rivers; at certain times of the year, they roost in immense numbers amongst the rocks in the Gorge of the Subansiri, noted such an occasion, 18-1-06, and Bhimpooora bhil in North Lakhimpur in the cold weather in parts is black with these Water Crows as they are somewhat rightly named by the "Dhoms" or fishermen.

Iris green; gular skin yellow; bill horny, darker on culmen; tarsus black.

421. *Phalacrocorax javanicus* (Horsf.) [1528].—The Little Cormorant.

Similarly distributed throughout the plains although is more frequently seen singly and in small parties.

422. *Plotus melanogaster* (Pennant.) [1529].—The Indian Darter.

More partial to sluggish forest streams and slow flowing rivers than the other Cormorants, but is plentifully distributed over the whole area.

423. *Ibis melanocephalus* (Lath.) [1541].—The White Ibis.

Confined to the low sandy banks of the large rivers. Subansiri below Boduti*, 2-11-07, 13-1-11, noted in small parties on both occasions, commonly occurs farther down the valley. In March 1909 noted as plentiful between Mangaldai and Singrighat on the Bramapootra in parties up to two dozen or thereabouts.

424. *Ciconia nigra* (L.) [1547].—The Black Stork.

Only locally distributed. Two large Black Storks seen on the Dejoor R., 18-12-10, were possibly this Stork, if not *Xenorhynchus asiaticus*, as they would not allow of a near approach, this record is uncertain. Komolabari, 18-11-11*, four seen together in company with several *Dissura episcopus* which were near at hand.

425. *Dissura episcopus* (Bodd.) [1548.]—The White-necked Stork.

Plentifully distributed in all well-watered areas.

426. *Xenorhynchus asiatica* (Lath.) [1549].—The Black-necked Stork.

Occurs on the large rivers in the plains, sluggish forest streams and large expanses of water, although is somewhat locally distributed. R. Dibru, backwater or "suti", five miles below Rungagora, 16-3-03, ♀, one of a small party which had its headquarters hereabouts; Bhimpooora bhil, Gogaïdhubie, 13-1-05, ♀, 16-12-05, ♂, 23-12-05, ♀; Dhunsirimukh, Bramapootra, 6-12-09, twelve of these storks a short distance below this ghat at scattered intervals; this number is the most ever seen at one time together; 15-1-11*, several pairs in company with Garials on the Bramapootra at close range to the river steamboat; Derpai, 16-1-06,* one rose

from a "pookri" at the foot hills, a favourite haunt of Buffalo. Iris bright yellow; bill black, inside dirty red; tarsus salmon red.

♀, 13-1-05. The gullet of this specimen contained 2 fish 10" in length. This bird was one of a party of six to eight individuals which frequented Bhimpooora bhil.

427. *Leptoptilus javanica* (Horsf.) [1551].—The Smaller Adjutant.

Sparingly distributed in suitable localities.

Khuddom, North Lakhimpur, 28-11-04, sex undetermined; Bhimpooora "bhil", North Lakhimpur, 19-12-05, ♂; Dejoo, 18-10-08, ♂; 17-11-10*, counted twenty-four this evening flying leisurely in a westerly direction.

L. dubius possibly occurs, although no personal observations available to prove its existence. ♂: Iris pearl white; orbital skin and gular patch continued to ears cabbage red; neck yellow ochre, lower portion cabbage red; bill horny yellowish, dirty at base; tarsus black as if coated with a limy wash.

428. *Ardea purpurea manillensis* (Meyer.) [1554].—The Eastern Purple Heron.

Ardea manillensis, Blanford, F. B. I., Vol. iv., p. 381.

Locally distributed throughout the whole district, frequents the dense reed vegetation along the banks of the sluggish rivers and "bhils" and generally roosts in companies. Iris light yellow; orbital skin yellow green: bill and tarsus yellow, olive and green.

429. *Ardea cinerea*, L. [1555].—The Common Heron.

Plentifully distributed; although frequents the dense reed thickets of the "bhils", is more partial to the open expanses of water and tanks or "pothar" land under water. In the cold season collects in some numbers along the sandy stretches of the large rivers as noted on the Subansiri below Boduti, 13-1-11, left bank in particular. Tinsukia, 20-2-02; Gogaldhubie, 6-1-05, ♂. Iris yellow; orbital skin, gape and cere greenish-yellow; base of upper mandible to beyond nostrils pale blue; lower mandible slightly similarly tinged, remainder of bill dirty yellow; culmen black, yellow line carried to tip under lower mandible; tarsus greenish yellow; claws horny.

430. *Ardea insignis*, Hodgs. [1557].—The Great White-bellied Heron.

Confined principally to the rivers at the base of the hills on the north frontier; during the cold season it extends into the plains, odd birds seen at rare intervals at this period on the Gurrung Jan, right bank river Dibru; Rungagora in heavy forest, the farthest distance from the foot hills that have come under observation although the sandy banks of the Subansiri from Boduti to Dhunsirimukh are invariably also frequented by this Heron at this time, noted on one occasion, 2-11-07. Observed on the upper reaches of the Panchnoi, Daphla hills; Dejoo R., Runganuddie; Dholong R., on several occasions; solitary and wary, seldom taken by surprise excepting when a sharp corner of some of the stony beds of the minor streams is negotiated it is then suddenly disturbed at very close range. This Heron as it stands motionless on a rapid of the fast flowing water when the rivers are in spate and the atmospheric conditions are anything but cheering adds a touch of wildness to the impressive character of its surroundings.

Joyhing, Runganuddie, 3-12-10, ♂. Iris dull ochreous yellow; loreal skin, orbital ring and base of lower mandible greenish; bill, upper mandible and inner margin of lower mandible blackish-slaty, tip of lower mandible underneath greenish-ochre, remaining portion mussle grey; tarsus black with horny patches; claws black.

Pathalipam, Subansiri, 19-12-10, ♀, adult. Iris pale ochreous yellow: bill bluish-black, tinged greenish at base, underneath lower mandible pale horn; tarsus and claws black.

431. *Egretta intermedia intermedia* (Wagl.) [1560].—The Smaller Egret.

Herodias intermedia, Blanford, F. B. I., Vol. iv., p. 386.

Specimens secured on the Dibru (March) and at Bhimpura bhil in North Lakhimpur (December) out of large parties, probably is generally distributed. Iris and bill yellow; tip of bill dusky in non-breeding season. *Egretta alba* and *E. garzetta*, both possibly occur but the Egrets have been neglected. *E. garzetta* may also have been overlooked as it can easily be confused with *Bubulcus coromanda* in non-breeding plumage which also is almost pure white though odd specimens at times show a trace of orange-buff markings in particular on the crown; the only safe character whereby the two species may be distinguished when not available for comparison is the bill of the former which is black at all seasons.

432. *Bubulcus coromanda* (Bodd.) [1562].—The Cattle Egret.

Tinsukia, "pothars" (Plains), April, also 31-10-02, ♂, numbers seen stalking over the swampy ground evidently feeding on various *Odonata* with outstretched neck and much flapping of the wings apparently, also with success although a dragonfly on the wing is no easy capture. No doubt other winged insects were also in demand. Specimens in white non-breeding plumage secured in the cold weather at Margherita and Komolabari.

433. *Ardeola grayi* (Sykes) [1565].—The Pond Heron.

Extremely common in low-lying land throughout the plains. These Herons are an excellent example of protective coloration as they squat with closed wings amongst the vegetation; the contrast when they rise and show their white feathers is startling.

434. *Butorides striata javanica* (Horsf.) [1567].—The Little Green Heron.

Butorides javanica, Blanford, F. B. I., Vol. iv., p. 395.

Confined to the banks of the rivers, equally suited to the clear swift flowing waters of the hill rivers or the turbid sluggish rivers in the plains. This little Heron is an adept at crouching amongst the stones and skulking in the dense vegetation although it is anything but wary.

435. *Nycticorax nycticorax nycticorax* (L.) [1568].—The Night Heron.

Nycticorax griseus, Blanford, F. B. I., Vol. iv., p. 397.

Occurs in the vicinity of Dibrugarh at all events, though the fact of not having specimens from other localities is more than likely due to its being overlooked.

436. *Gorsachius (Gorsakius) melanolopha* (Raffles) [1569].—The Malay Bittern.

Lilabari to Pathalipam (Rajghur), North Lakhimpur, 9-10-07, ♂.

Dejoo (Rajghur), North Lakhimpur, 24-5-08, ♂, (3032), breeding.

Parent bird shot off nest which contained four eggs, average size $2'' \times 1\frac{1}{2}''$, in color dirty yellowy white, hard set, and in one example chipped with the chick on the point of emerging. Nest originally found on the 12-5-08 was placed on the branch of a light tree overhanging a small stream in forest about 20' in height from the bed of the stream and was a flimsy piled up structure of thin twigs. It was quite impossible to examine the nest without climbing up the tree and at great difficulty lopping off the heavy branch overhanging whilst my man made a feeble attempt at supporting some of the weight with a forked sapling whilst it was gradually drawn towards me. During this time the rain fell in torrents

as only it can during the south-west monsoon in Assam. My plight and mental condition at finding the eggs hard set after all our trouble can be well imagined.

No. 3032. Iris greenish-yellow ; orbital skin bluish-grey ; bill dusky with light edges under the lower mandible ; tarsus greenish-dusky.

437. *Ixobrychus sinensis* (Gm.) [1571].—The Yellow Bittern.

Ardetta sinensis Blanford, F. B. I., Vol. iv., p. 401.

Rungagora, 13-5-01, ♂, 28-5-03 ♂. Iris yellow ; tarsus greenish-yellow. Apparently not as common as *I. cinnamomea*.

438. *Ixobrychus cinnamomea* (Gm.) [1572].—The Chestnut Bittern.

Ardetta cinnamomea, Blanford, F. B. I., Vol. iv., p. 402.

Rungagora, 4-6-03, ♀ ; 25-6-03, ♀ ; 4-8-03, ♂ ; 5-8-0-3 ♂ ; North Lakhimpur, 11-6-04, ♂ ; Gogaldhubie, 13-1-05, ♀. Evidently generally distributed although much more in evidence at the rainy season.

439. *Dupetor flavicollis* (Lath.) [1573].—The Black Bittern.

Equally distributed in all suitable well-watered localities ; commonly seen by day in its retiring haunts. Rungagora, Komolabari, Dejoo.

440. *Botaurus stellaris stellaris* (L.) [1574].—The Bittern.

Dejoo, 11-6-10, a pair of large Bitterns passed overhead this morning to eventually settle in an adjacent "bhil". No specimens have been secured, but this record is most probably referable to this species.

441. *Anser anser* (L.) [1579].—Grey Lag Goose.

Anser ferus, Blanford, F.B.I., Vol. iv., p. 416.

Bramapootra, fifteen miles below Sadiya, 12-3-03, sex ?

" Lali camp, cold season, 1904, sex ?

Tinsukia, 30-10-02, a specimen in flesh sent in by the late Dr. Gregorson. North Lakhimpur, 7-11-08*, a long line of Geese passed over the club house about 5-30 p.m. flying very low in the direction of the Runganuddie, evidently had just dropped down to the plains.

Dejoo, 22-3-10, a dark coloured Goose, flying high, eventually descending in the direction of the Runganuddie, passed overhead, calling at intervals. Subansiri between Bodutti and Dhunsirimukh, 13-1-11, numbers of Geese in evidence ; the orange colour of the tarsus particularly attracted my attention.

Subansiri below Bodutti, 9-11-10, noted a party of about thirty pass slowly down the river.

Some of these records may refer to other species of Geese as my opportunities to secure specimens have been only limited.

The Grey Lag is undoubtedly the Common Goose in Upper Assam. Seen on occasions coming down the Subansiri Gorge, a single, 31-1-06, and has been shot at Pathalipam and Joyhing. The usual difficulty is experienced in getting sportsmen to even preserve the bills and tarsi so that our knowledge of the distribution of these birds increases very slowly.

442. *Sarcidiornis melanotus* (Penn.) [1584].—The Nukta.

Sarcidiornis melanotus, Blanford, F. B. I., Vol. iv., p. 423.

Komolabari, Sibsagar, 18-11-11, a few Nukta seen hereabouts on a "bhil ;" adjacent to the North Lakhimpur road.

443. *Asarcornis scutulata* (S. Müll.) [1585].—The White-winged Wood-Duck.

Confined to swamps, "bhils," streams in forest, "jans" and "pokris," occasionally occurs in the upper reaches of the hill rivers in North Lakhimpur.

Rungagora, Gurrung Jan; Paropara Jan.; R. Dibru, Digiltarung; Buri bhil, Derpai; Laluk, 10-4-11*, Joyhing, R. Dejoo, 20-1-09,* four Wood-Duck passed overhead in a corner of the garden adjacent to the "bhils," Dejoo, 10-8-08*; Rungagora, 23-2-02; Gurrung Jan in deep forest. Observed five together, generally seen in singles and in threes. The difference in weight is not confined to one sex, shells similar to what occur at the bottom of the "jans" found in the gullet of one bird. Its call is an unmistakeable long drawn "honk."

Rungagora, 2-02, ♀; 10-3-03, ♀, ♂; 17-3-02, ♀, iris orange; bill dark yellow and freckled with dull dusky spots; nail light horny; tarsus orange yellow; claws horny; 3-4-03, ♂; 5-4-03, ♂; bill orange yellow spotted with black; nail slaty horny streaked dark; tarsus dull yellow with bright yellow spots. 13-1-04, ♂, iris red orange yellow, weight 6 lbs. 5 $\frac{3}{4}$ oz. 13-1-04, ♀, iris red orange yellow, weight 4 lbs.; 30-1-04, ♀, weight 3 lbs. 15 oz.; 30-1-04, ♂, weight 4 lbs. 12 $\frac{1}{2}$ oz. in poor plumage.

The weight of other males ran as follows: 5 lbs. 10 oz., 5 lbs. 9 oz., 6 lbs. 1 oz.

444. *Ærgalericulata* (L.).—The Mandarin Duck.

R. Dibru, two miles below Rungagora, ♀, secured out of a small party of mixed sexes. A single female seen farther down the river the following week was probably a winged bird.

Recorded Journal, B. N. H. Socy., Vol. xiv., p. 626.

The Mandarin Duck, of which the handsome drake is now so well known as an ornamental species, has not again been met with since the above occasion.

445. *Casarca ferruginea* (Pall.) [1588].—The Ruddy Sheldrake.

Casarca rutila, Blanford, F. B. I., Vol. iv., p. 428.

Common on all the large rivers, occasionally occurs on some of the large expanses of water as Bhimpooora bhil in North Lakhimpur. Blanford's notes on the habits of this, the well known Brahminy Duck, could not be improved upon.

446. *Dendrocygna javanica* (Horsf.) [1589].—The Whistling Teal.

Confined to the sluggish rivers, occurs generally in small parties.

447. *Nettopus coromandeliana* (Gm.) [1591].—The Cotton Teal.

Resident: equally distributed in all suitable localities. Mokalbari, Komolabari, Bordeobam, Gogaldhubie; in the cold season in large parties on the "bhil."

448. *Anas platyrhynchos platyrhynchos* L. [1592].—The Mallard.

Anas boschas, Blanford, F. B. I., Vol. iv., p. 435.

R. Dibru, Rungagora, 16-12-03, ♀; Bhimpooora "bhil", Gogaldhubie, 9-1-05, ♀, 8-12-07, ♂.

♀. Iris brown; bill yellow dappled and stippled with black; tarsus salmon red.

449. *Anas pæcilorhynchos haringtoni*, Oates [1593 B].—The Burmese Spotted-billed Duck.

Anas pæcilorhynchos, Blanford, F. B. I., Vol. iv., p. 436 (part).

Dibru, suti or backwater, six miles below Rungagora, 14-3-03, ♀, many seen at same time (ten in all counted).

Gogaldhubie, 7-12-05, ♂, others secured on other occasions at Bhimpooora bhil.

Apparently generally distributed, undoubtedly replaces *A. p. pæcilorhynchos* in Upper Assam.

Subansiri, below Bodutti, 13-1-10, numbers seen on right bank.

450. *Eunetta falcata* (Georgi.) [1594].—The Baikal Teal.

Bhimpoora bhil, Gogaldhubie, 8-12-07, ♂, others probably overlooked although the males could hardly be done in a like manner.

♀. Tarsus olivaceous slaty.

451. *Anas strepera*, L. [1595].—The Gadwall.

Chaulelasmus streperus, Blanford, F. B. I., Vol. iv., p. 440.

Cold season, migrant, one of, if not the commonest duck in the district. Bhimpoora bhil, December, January, March. Dejoo, 25-9-10, single, flying overhead. Dejoo, Kopatula Jan, 5-11-08, ♀, in company with a Common Teal ♀ (*Anas crecca*). The Gadwall had been in evidence for some time in the "jans" in garden.

452. *Anas crecca crecca*, L. [1597].—The Common Teal.

Nettion crecca, Blanford, F. B. I., Vol. iv., p. 443.

Rungagora, (October, 14-10-03, ♀), January, March; Bhimpoora "bhil," Gogaldhubie, December, January, February.

Occurs commonly throughout the plains in the cold season.

453. *Anas penelope*, L. [1599].—The Wigeon.

Mareca penelope, Blanford, F. B. I., Vol. iv., p. 445.

North Lakhimpur, 25-3-05, ♂. Possibly occurs frequently on the open rivers though overlooked.

454. *Dafila acuta* (L.) [1600].—The Pintail.

Bhimpoora bhil, Gogaldhubie, December, February; North Lakhimpur, 22-10-10, a party of fifteen flew over the club house at a low elevation. When disturbed Pintail fly very high and keep well out of gunshot range.

455. *Anas querquedula*, L. [1601].—The Garganey.

Querquedula circia, Blanford, F. B. I., Vol. iv., p. 449.

Locally distributed, occurs sparingly at Bhimpoora bhil, North Lakhimpur; this Teal is generally found with *A. crecca* at the edge of the shallow water of this "bhil".

456. *Spatula clypeata* (L.) [1602].—The Shoveller.

Locally distributed, partial to small "bhils" in open country generally; once secured in forest on the Likwa Jan between the Bramapootra and the Dangri R., 7-11-03, ♀; and also on the Subansiri R. opposite Hessamara, 11-4-05, ♂ adult, procured at early morning on the bank, heavy gale the night previous, which may have accounted for this duck in this unaccustomed haunt. Mokalbari, Dibrugarh.

457. *Nyroca rufina* (Pall.) [1604].—The Red-Crested Pochard.

Netta rufina, Blanford, F. B. I., Vol. iv., p. 456.

Bhimpoora bhil, North Lakhimpur, January; Tinsukia, March.

458. *Nyroca ferina ferina* (L.) [1605].—The Pochard.

Bhimpoora bhil, North Lakhimpur, January.

459. *Nyroca nyroca* (Güld.) [1606].—The White-eyed Duck.

Nyroca ferruginea, Blanford, F. B. I., Vol. iv., p. 460.

Likwa Jan, Forest between Bramapootra and Dangri R., 7-11-03, ♀; Bhimpoora bhil, North Lakhimpur, December, January.

460. *Nyroca baeri* (Radde.) [1607].—The Eastern White-eyed Duck.

Bhimpoora bhil, North Lakhimpur, 13-1-05, ♀; 23-12-05, ♀.

461. *Nyroca fuligula* (L.) [1609].—The Tufted Duck.

Tinsukia, cold season, 1902, ♀.

462. *Mergus merganser comatus*, Salvadori [1613].—The Goosander.

Merganser castor, Blanford, Vol. iv., p. 469.

Occurs on all the open large rivers in the cold season.

Bramapootra, Lali Mukh, 6-1-02, ♂.

Subansiri, Hessamara, three miles below, 31-12-05, ♂; on the 28-12-05*, seen to the number of twenty or thereabouts sporting in the river: 7-1-06, ♀; Dhulong Mukh, Subansiri, 14-1-06, ♀; Subansiri Gorge. 26-1-06, ♀; Dejoo, Runganuddie, 1-3-09*, still in evidence. ♂, iris reddish-brown or brown; tarsus bright orange vermillion red, salmon red or pale fleshy red; bill, culmen black, sides of upper mandible rosy pink or dark red.

463. *Colymbus cristatus cristatus*, L. [1615].—The Great Crested Grebe.

Podiceps cristatus, Blanford, F. B. I., Vol. iv., p. 473.

Tinsukia, April 1903, ♀; Bhimpooora bhil, North Lakhimpur, 7-4-05, ♂: Sissi, main channel of Bramapootra, 23-2-08*; seen on the Subansiri at Hessamara, 12 ?-4-05 and reported from Derpai by Mr. J. L. Alexander. This Grebe depends more on its expert diving capacities than its power of flight on the wing when in danger.

464. *Colymbus ruficollis albipennis* (Sharpe) [1617].—The Indian Little Grebe.

Podiceps albipennis, Blanford, F. B. I., Vol. iv., p. 475.

Tinsukia, 21-2-02, ♂; Bhimpooora "bhil," Gogaldhubie, January.

Iris yellow; bill orange yellow; upper mandible horny at tip, at base lemon yellow; tarsus dull green, brown on upper surface.



CALAPPA PALM (*Actinorhytis calapparia*, W. & Dr.), growing in the Botanic Garden of Peradeniya.

THE PALMS OF BRITISH INDIA AND CEYLON,
INDIGENOUS AND INTRODUCED.

BY

E. BLATTER, S.J.

PART XIII.

(With Plates LXXV—LXXIX).

(Continued from page 531 of this Volume.)

ACTINORHYTIS, Wendl. and Dr. Linn., 39 (1875), 184.

(From the Greek “actis,” ray, and “rhytis,” a fold.)

Bl. Rumph. II, 68, t. 100, fig. 2 (*Areca*)—Mart., Hist. Nat. Palm. III, 313 (*Seaforthia*)—Miq., Fl. Ind., Bat. III, 20 (*Ptychosperma*)—Scheff Ann. Jard. Bot. Buitenz., I, 122, 136, 156, t. 22, 23.—Griff., Palms Brit. Ind., 150, t. 230 B.—Benth. and Hook., Gen. Pl. III, II, 889, 14.

High slender columnar unarmed palms, strongly annulate. Leaves terminal, equally pinnatisect; segments linear-lanceolate, acute, obliquely dentate at the apex, thickened on the margins, recurved at the base; rhachis and plano-convex petiole furfuraceous.

Spadix short-pedunculate with flexuose pendulous branches; spathes 2, complete, complanate, caducous, the lower one elongate, 2-cristate. Flowers monœcious on the same infraroliateous spadix, the lower ones ternate with the median one female, or the upper ones male, solitary and binate, all with bracts and bracteoles. Male flowers minute, asymmetrical. Sepals orbicular, compressed-carinate, concave, broadly imbricate. Petals 3, ovate, thickly coriaceous, subequal, valvate. Stamens 24-30. Female flowers much larger, ovoid. Sepals 3, reniform rotundate, broadly imbricate. Petals slightly longer.

Fruit large, roundish-elliptic; remains on stigma vertical; pericarp thick fibrous. Seed large, round, or elliptic; raphe densely branched; albumen ruminant.

SPECIES.—1.

DISTRIBUTION.—Malay Archipelago.

ACTINORHYTIS CALAPPARIA, W. & Dr. in Linnæa, XXXIX (1875), 184.—*Pinanga calapparia*, Rumph. Amb., I, 28. Valent. Amb., III, 185.—*Areca calapparia*, Bl. Rumph., II, 68, t. 100, fig. 2.—*Seaforthia calapparia*, Mart., Hist. Nat. Palm, III, 313.—*Ptychosperma calapparia*, Miq. Fl., Bat., III, 20.—*Areca cocoides*, Griff., Calc. Journ. Nat. Hist., V, 454. Palms Brit. Ind., 150, t. 230 B.

NAME.—Pinang Punowun (Malay); Calappa Palm (English).

DESCRIPTION.—Stem 40 feet high; crown dark green, ample. Leaves pinnate; petiole scurfy, plano-convex; lamina 8-9 feet long, 4-4½ broad, in outline lanceolate-acuminate; pinnae 2 feet long, 1¼-1½ inches broad, linear, acuminate, unequally bipartite shining, very smooth, uppermost inequilateral, sub-erose at the top; central vein and 5 others forming as many heels above, the central underneath bearing scales attached by the base.

Spadix ascending altogether green, branches stiff, stout, above flexuose-torulose owing to niches in which the flowers are lodged. Spathes 2. Lower flowers: 1 female between 2 males, upper males in pairs. Male flowers small; sepals imbricate, carinate, hard, much shorter than the corolla, margins sub-membranous, denticulate, inner rather the longest. Corolla valvate, hard, tripartite to the base; petals oblong-lanceolate, sub-obtuse. Stamens 24-30, in bundles, anthers linear-sagittate, pistillode small, subulate or none. Female flowers: sepals and petals imbricate with very broad bases. Staminodes 3 or none. Ovary large, white, oblong, 1-celled, sub-compressed, divided at the apex into 3-cuneate, subrecurved lobes, each with a line of stigmatic tissue along the central line of the inner face; ovule 1, attached nearly along its whole length.

Fruiting spadix spreading; branches angular, thickened at the base. Fruit pendulous from its weight, ovate, size of a duck's egg, surrounded at the base by the perianth, at the apex presenting the 3 styles; colour orange-yellow; pericarp thick, firm, of yellow cellular tissue and longitudinal fibres, which are more numerous towards the putamen. Putamen thin, hard, crustaceous. Seed 1, erect; tegument thin, shining, light brown; albumen densely horny, much ruminant; embryo basilar.

HABITAT.—Malay Archipelago.

ILLUSTRATION.—Plate LXXV shows a fully developed specimen of the *Calappa Palm* growing in the Botanic Garden of Peradeniya. At the base of the leaf-sheaths an unexpanded spadix may be seen whilst a little lower down at least four fruiting spadices are visible. The photograph was taken by Mr. Macmillan.

PTYCHORAPHIS, Becc., Males, I, 53, cf. Beccari in Ann. Jard. Bot. Buit., II, 90; Males, III, 109; Webbia, I (1905), p. 327.

(From the Greek "ptychos," folded, wrinkled, and "raphis," needle, pin.)

Stem slender, annulate. Leaves pinnatisect, leaflets narrow, caudate-acuminate.

Spathes 2, complete, caducous. Spadix infrafoliar, paniculately branched. Flowers spirally disposed, male only towards the tips of



Ptychoraphis augusta, Becc.

the branches, a female between 2 males towards the base. Male flowers symmetric; sepals suborbicular; petals valvate; stamens 6; anthers versatile; pistillode conical or columnar. Female flowers bibracteolate; sepals rounded, concave; petals longer, tips valvate; stamens 4-6; ovary ovoid; stigmas 3, triangular, acute; ovule parietal.

Fruit small, ovoid, stigmas terminal. Seed ovoid, obtuse, deeply grooved along the long, linear hilum, albumen deeply ruminant; embryo basilar, oblong.

SPECIES.—3, Malayan.

Leaflets 2-3 feet long *P. augusta*.

Leaflets about 1 foot long *P. singaporensis*.

PTYCHORAPHIS AUGUSTA, Becc., in Ann. Jard. Bot. Buitenz., II, 90; Males, III, 110.—*Areca augusta*, Kurz., in Journ. Bot., 1875, 331, t. 170.

DESCRIPTION.—Trunk very tall, 80-100 feet high, 1 foot in diameter. Leaves 8-12 feet long; leaflets numerous, 2-3 feet long, sessile, narrowly linear, acuminate, 3-costate; petiole very short; rhachis flat above, furfuraceously tomentose.

Spadix decomposed, $2\frac{1}{2}$ - $3\frac{1}{2}$ feet long. Male flowers: bracts broad, smooth; sepals broadly ovate; petals oblong, obtuse. Female flowers: sepals and petals nearly alike, concave, imbricate.

Fruit 1 inch long, elliptic-oblong, scarlet. Seed oblong.

HABITAT.—Nicobar Islands, frequent, in woods in Kamorta.

ILLUSTRATION.—We reproduce on Plate LXXVI a middle-sized specimen of *Ptychoraphis augusta*.

The right side of the background is occupied by a grove of coconut palms. We have to thank Major Gage for the photograph.

PTYCHORAPHIS SINGAPORENSIS, Becc., in Ann. Jard. Bot. Buitenz., II, 90, t. 196; Males, III, 109; Hook, Fl. Brit. Ind., VI, 413; Ridley, Fl. Malay Penins., II, 148.—*Ptychosperma singaporensis*, Becc., Males I, 61.—*Rhopaloblaste singaporensis*, Hook., f. in Gen. Pl. III, 892.—*Drymophloeus singaporensis*, Hook., f. Kew Gard. Rep. (1882) 1884, 55.

NAMES.—In Singapore: Rintin, Kerintin. German: Singapore-Runzel-Areka.

DESCRIPTION.—Stem slender, 6-12 feet high, $1\frac{1}{2}$ inch in diameter, soboliferous, black, ringed.

Leaves pinnate; petiole nearly 3 feet long, blade 4 feet, leaflets very many, alternate, narrow linear acuminate, 8-12 inches long, $\frac{1}{2}$ inch wide, 3-nerved, upper shorter, midrib beneath scaly; rhachis scurfy.

Spadix slender, deflexed, about 1 foot long, about 5-7 branched from the base; spikes moderately slender, $\frac{1}{8}$ inch thick, rhachis olive green (according to Ridley), rusty furfuraceous (according to Fl.

Brit. Ind.). Spathes sword-shaped, apex rounded, convex outside, broadly channelled inside, winged, inner spathe shorter, narrower, not winged, woolly. Flowers in pairs numerous and close, a male and a female together, or females only at base, males at tip. Male flowers: sepals ovate orbicular, petals larger, ovate, acute, $\frac{1}{8}$ inch long, white or yellow. Stamens 6, filiform, white; anthers small, oblong, dorsifixed. Pistillode large, conic. Female flowers with a transversely oblong bract. Sepals ovate, truncate, gibbous, green, petals shorter, ovate, acute, green. Pistil obovoid. Stigmas minute, triangular.

Drupe nearly $\frac{2}{3}$ inch long by $\frac{1}{4}$ inch in diameter, ovoid or elliptic-ovoid, red, pulpy, tip conical, slightly excentric. Seed free, elliptic-ovoid, rounded at both ends, $\frac{3}{8}$ inch long, grooved on one face, branches or raphe descending to the base; albumen ruminant.

HABITAT.—Singapore: Sanglin, Sungei Buluh, Chan Chu Kang, Toas, Kranji; Johor: Gunong Pulai; Dindings: Sumut (ex Ridley).
 cultivated in India.

USES.—The stems which are quite black make beautiful walking sticks (Ridley).

DICTYOSPERMA, Wendl. & Drude Linn., 39, 181.

(From the Greek “dictyon,” a net, and “sperma,” seed; in allusion to the raphe of the seed forming a loose network).

Mart., Hist. Nat. Palm, III, 175, t. 154, fig. 2, 3 (*Areca*)—Baker, Fl. Maurit., 383.—Scheff., Natuurk. Tijdsch. Ned. Ind., 32, 183. (*Ptychosperma album*)—Benth. & Hook, Gen. Pl. III, II, 890, 1.

Unarmed, of moderate height; leaves equally pinnate; petiole with a complete basal sheath; pinnæ strongly reduplicate at the base, 1-nerved; with a few scales beneath; the terminal pinnæ confluent.

Monœcious. Flowers in spirally disposed 3-flowered clusters on the branches of a simply subfastigiately branched spadix, the female flower between and below two males. Male flowers: inner segments of perianth valvate, thickened, ovate-oblong, acute; stamens 6, included; pistillode a terete column, shorter than the stamens. Female flowers: segments of perianth imbricate; staminodes forming a ring with 6 linear teeth.

Fruit olive-like, persistent; scar of the stigma exactly apical; mesocarp fibrous; endocarp slender, crustaceous. Seed attached to the endocarp on one side throughout its whole length; raphe forming a loose network; albumen ruminant; embryo subbasilar.

SPECIES.—3.

DISTRIBUTION.—Mascarine Islands.

CULTIVATION IN EUROPE.—Stove palms. A compost of loam, peat, and leaf soil, in equal parts, with a liberal addition of sand



Dictyosperma Album, Wendl. *var. aureum* Balf. f., in the Sibpur Botanic Gardens.

suits them very well; loam should preponderate to the extent of about two-thirds; when fully developed, some rotten cow-manure may be added with advantage. The seeds should be sown in a similar compost and kept in a moist, gentle heat. The greatest enemy of this palm is dry warm air. Dammer has found that the plants do quite well in a cool room during winter. Young specimens get easier accustomed to the air of a room than older ones. They require much water. The *Dictyospermas* are great favourites on account of the beautiful colouring (red, yellow) of the leaf-stalks and nerves.

DICTYOSPERMA ALBUM, Wendl., in Linnæa XXXIX, 181; Balf., f. in Baker. Fl. Maurit & Peych, 384. Drude Palmæ, 75.—*Areca alba*, Bory Voy., I, 306; Willd., Spec. Pl. IV, 596, n. 8; Poir, Encycl. Suppl. I., 441, n. 9; Spreng, Syst. Veg., II, 139, n. 7; Mart., Hist. Nat. Palm, III, 175, t. 154, 155, fig. 2.—*Areca borbonica*, Hort.—*Sublimia palmicaulis*, Commers. Mss.—*Ptychosperma album*, Scheff., Natuurk. Tijdsch. Ned. Ind., 32, 183.

NAMES.—Weisser Netzsame (German).

Palmiste blanc, Palmiste commun (French).

DESCRIPTION.—A very variable plant. Stem 40-50 feet high, 8-9 inches in diameter, dilated at the base. Leaves 8-12 feet long; petiole semiterete, 6-18 inches long, grooved down the face; leaflets $2\frac{1}{2}$ -3 feet long, 2-3 inches broad, lanceolate, acuminate cuneate at the base, widely reduplicate, with one prominent median nerve, and 3 lateral, secondary nerves on each side, all bearing a few medially attached scales, especially towards the base of the leaflets; veins and margins of leaflets green or reddish.

Spadix 2 feet long, with a very short, often tomentose peduncle; branches erect or slightly reflexed, 6-18 inches long, very zigzag when young; flowers often distichous at the base of the branches; spathes 1-1 $\frac{1}{2}$ foot long. Inner segments of male perianth $\frac{1}{4}$ inch long, three times as long as the outer.

Fruit ovoid-oblong, pointed, about $\frac{1}{2}$ inch long, purplish.

HABITAT.—Mauritius, common; Seychelles, not indigenous, Bourbon.

DICTYOSPERMA ALBUM, Wendl., var. *aureum*, Balf. fil. in Baker Fl. Maurit. and Seych., 384—*Areca aurea*, Hort.

NAMES.—Goldfarbiger Netzsame (German).

Palmiste bon (French).

DESCRIPTION.—Stem about 30 feet high, smaller and more slender than in the type.

Leaves 4-8 feet long; petiole 8 inches long; leaf-sheath 1-2 feet long; pinnæ 1 $\frac{1}{2}$ -2 feet long, 1 inch broad; secondary veins scarcely visible.

Branches of the spadix rigidly erect, 9-11 inches long. Flowers half the size of those of the type.

Fruit cylindrico-conic, $\frac{2}{3}$ - $\frac{3}{4}$ inches long. Young plants bright orange.

HABITAT.—Rodriguez, common.

ILLUSTRATION.—The beautiful specimen of *Dictyosperma album*, var. *aureum* reproduced on Plate LXXVII, grows in the Sibpur Botanic Gardens, and its photograph was kindly supplied by Major Gage.

ARCHONTOPHÆNIX, Wendl. & Drude, in Linnæa, XXXIX, 182, 190, 211, t. 3, f. 6.

(Etym : From the Greek “archon”, ruler, king, and “phœnix”, palm, in allusion to their majestic aspect and their relationship.)

Mart., Hist. Nat. Palm, II, 181 (non. t. 105, 106, 109 uti habent, Benth. & Hook, Gen. Pl.).—F. Mueller, Frag. Phyt. Austr., V, 47, t. 43, 44 (*Ptychosperma*).—Benth., Fl. Austr., VII, 141 (*Ptychosperma*, sp. n. 2, 3).—Bot. Mag., t. 4961 (*Seaforthia*, excl. fig. 9, 10 11).—Benth. & Hook, Gen. Pl. III, II, 889, 15.—Bailey, Queensl. Fl., V, 1674.

Stem high and slender, columnar, unarmed, strongly annulate. Leaves terminal, equally pinnatisect, forming a dense crown; segments linear-lanceolate, acuminate, or bidentate at the apex, the margins recurved at the base; rhachis convex on the back, carinate on the upper side; petiole canaliculate on the upper side; sheath elongate, cylindric.

Spadices shortly pedunculate, thrice divided, branches and branchlets flexuose, slender, pendulous, glabrous; spathes 2, complete, elongate, complanate, caducous; bracts semilunar; bracteoles persistent. Flowers monœcious, spirally arranged, ternate, the median one female, or solitary and binate males, bracteate and obscurely bracteolate. Male flowers asymmetrical. Sepals 3, small, triangular, rotundate, carinate, imbricate. Petals 3, obliquely ovate-oblong, subacute, valvate. Stamens 9-24; filaments slender, connate at the base, inflexed at the apex; anthers linear, bifid at the base, dorsifixed, versatile. Pistillode styliform. Female flowers smaller than the male, subglobose. Sepals 3, orbicular, convolute-imbricate. Petals similar, but smaller. Staminodes 6, subulate, or ovary trigonous-ovoid, 1-locular; stigmas 3, minute, recurved; ovule parietal.

Fruit small, globose-ellipsoid, umbonate by the subterminal stigmas; pericarp fibrous; endocarp very thin. Seed erect, closely adhering to the endocarp, smooth; hilum lateral, elongate; branches or raphe reticulate; albumen deeply ruminant; embryo basilar.

SPECIES :—4.

DISTRIBUTION.—Tropical and subtropical, East Australia.



ALEXANDRA PALM (*Archontophœnix Alexandræ*, W. & Dr.).

CULTIVATION IN EUROPE.—A genus of elegant stove palms. The species thrive best in fibrous loam, leaf mould, and sand. Thorough drainage and an abundant supply of water are important points in their culture. Propagation is effected by seeds.

Leaf-segments glaucous on the underside ... *A. alexandræ*.

Leaf-segments green on both sides ... *A. cunninghamii*.

ARCHONTOPHÆNIX ALEXANDRÆ, W. & Dr., in Linnæa, XXXIX, 212; Bailey, Queensl. Fl., V, 1675—*Ptychosperma alexandræ*, F. Muell, Fragm. Phyt. Austr., V, 47, 213, t. 43, 44; Benth., Fl. Austr., VII., 140.

NAMES.—Alexandra Palm (English.)

Alexandra Herrscherpalme (German).

DESCRIPTION.—A tall palm, stem attaining 70-80 feet. Leaves several feet long; rhachis very broad and thick, glabrous or slightly scurfy; segments numerous, the longer ones $1\frac{1}{2}$ foot long, $\frac{1}{2}$ -1 inch broad, acuminate and entire or slightly notched, green above, ashy-glaucous or white underneath.

Spathe $1\frac{1}{2}$ foot long. Panicle when open above 1 foot long and broad; much branched, the rhachis more or less angular and flexuose, the notches scarcely immersed. Male perianth 2-3 lines long; the inner segments very often oblique, pale coloured; the outer segments about 1 line long, slightly imbricate. Stamens usually 9 or 10, but varying from 6-14; filaments very short. Female perianth about 2 lines long, the segments all broad, and about equal in length.

Fruit ovoid globular, 7-9 lines long.

HABITAT.—Queensland: Rockingham Bay, Mackay, and many other tropical localities (Bailey).

ILLUSTRATION.—Plate LXXVIII represents two elegant, slender stemmed specimens of the Alexandra Palm. Photograph by Mr. Macmillan in the Botanic Garden of Peradeniya.

ARCHONTOPHÆNIX CUNNINGHAMII, Wendl. & Drude, in Linnæa, XXXIX, 214; Bailey, Queensl. Fl., V, 1675—*Seaforthia elegans*, Hook, Bot. Mag. No. 4961, excl. fig. 9, 10, 11 (not of R. Br.)—*Ptychosperma Cunninghamii*, Wendl. & Drude, in Bot. Zeitz. (1858), 346; Benth., Fl. Austr., VII., 140.

NAMES.—English: Cunningham's Seaforthia.

German: Cunningham's Herrscherpalme.

DESCRIPTION.—Stem attaining a height of 60 feet, erect, slender, annulate, dark green, almost glossy, crowned with a spreading tuft of beautifully pinnate leaves. Leaves 8-10 feet long, petioles sheathed at the base. Leaflets numerous, narrow-lanceolate, spreading, $1-1\frac{1}{2}$ foot long, several of them unequally bifid at the apex, one segment being much longer than the rest.

Spadices below the bases of the leaves, fleshy, dull pale-lilac, each surrounded by 2 spathes, drooping, much-branched. Flowers many scattered, some male, some female. Anthers of male flowers rather oval-oblong than linear. Female flowers with the rudiments of 6 stamens at the base.

Fruit like *A. alexandræ*.

HABITAT.—Queensland: Sunday Island; Rockhampton; N. S. Wales: Illawarra, Woolongong.

ILLUSTRATION.—Visitors to Bombay will at once recognize the spot in which the palms shown on Plate LXXIX is growing. We wish to draw attention to the dense fruiting spadices arising from the base of the leaf-sheath. Mr. Phipson has personally taken the photograph.

(To be continued.)



CUNNINGHAM'S SEAFORTHIA (*Archontophoenix Cunninghamii*, W. & Dr.).

LIST OF THE BIRDS OF BALUCHISTAN.

BY

LT.-COL. H. DELME RADCLIFFE, F.Z.S.

(Royal Welch Fusiliers).

Compiled with reference to the Fauna of British India "Birds" by Oates and Blanford. The number in brackets after the English name is that of the species in the Fauna.

There is no doubt that more species will be added to this list in future, especially amongst the warblers, chats, wagtails, larks, swifts, owls, and hawks of which this I am sure does not give a complete list. Additions too will be made among the plovers, gulls and other sea-birds from the coasts of Baluchistan.

FAMILY: CORVIDÆ.

1. *Corvus corax*.—The Raven. [1].

Very common at all seasons. Many frequent the Cantonments at Quetta. This species breeds in the Baluchistan Mountains. Capt. (now Lt.-Col.) Marshall, Royal Garrison Artillery, in his Notes mentions that he found a nest with fresh eggs on March 24th. I saw half-fledged young birds near Killa Abdullah and Shela Bagh in May 1912. There are several specimens in MacMahon Museum at Quetta.

2. *Corvus umbrinus*.—The Brown-necked Raven. [2].

Common in the Quetta Valley during the winter months, though I never observed this species in summer. I obtained a fine male specimen at Samungli near Quetta on November 14th, 1911, and presented the skin to the Bombay Natural History Society, and shot another good specimen in my garden in Quetta in November 1913.

3. *Corvus frugilegus*.—The Rook. [5].

Frequents the Quetta Valley in flocks during the cold months of winter, but I never observed it in summer. It certainly does not breed in Baluchistan. There are two specimens in the MacMahon Museum at Quetta.

4. *Corvus monedula*.—The Jackdaw. [9].

I have occasionally observed this species in cold winter months, intermingled with the flocks of Rooks frequenting the Quetta Valley, but never observed it at any other time of year. There is a specimen of this species in the MacMahon Museum at Quetta.

5. *Pica rustica*.—The Magpie.

Common in Baluchistan at all seasons, specially in the higher valleys, where it breeds. It is very common at Ziarat, 8,000 feet above sea-level and breeds in the Juniper Forest there. Marshall mentions finding a nest with 3 fresh eggs on May 15th. In winter it comes down to the Quetta Valley, and I have seen a few in Cantonments there. I shot a fine male specimen at Ziarat in June 1912. There is one specimen shot at Pishin, in the MacMahon Museum at Quetta.

6. *Graculus eremita*.—The Red-billed Chough. [29].

This species frequents the Quetta Valley in flocks in the cold winter months. In summer it is only found in the higher mountains. Nests with

young were found on Peel Mountain near Kach in May 1913 by Lieut. Shephard, Essex Regiment, when the Regiment was in Camp near Kach for training. There are 3 specimens of this species in the MacMahon Museum at Quetta. I have been told that the yellow-billed Chough has been observed in Baluchistan, but this requires confirmation. No specimen has to my knowledge been obtained.

7. *Parus atriceps*.—The Indian Grey Tit. [31].

Common in summer in the higher mountains of Baluchistan, where it breeds. I saw many young birds in the nesting plumage at Ziarat in June and July. In winter it is common in the Quetta Valley, frequenting the gardens and orchards. There is a specimen of this species in the MacMahon Museum at Quetta.

8. *Ægithaliscus leucogenys*.—The White-cheeked Tit. [37].

Common in the higher mountains of Baluchistan in summer. I saw many young birds in nestling-plumage in June and July at Ziarat, and obtained one specimen. I never observed it in the Quetta Valley.

9. *Lophophanes melanolophus*.—The Crested Black Tit. [44].

Common at Ziarat in summer, and breeds there. I saw many young birds in nestling plumage in June and July. I obtained 2 specimens, one in adult, and one in nestling plumage at Ziarat in June 1912. I never observed it in the Quetta Valley.

CRATEROPODIDÆ.

10. *Trochalopteron lineatum*.—The Himalayan Streaked Laughing Thrush. [99].

Frequents the bushy nullahs in the higher mountain valleys near Ziarat, though not in large numbers. I obtained a specimen, which I presented to the MacMahon Museum at Quetta, in June 1912, near Ziarat, and I feel sure that it breeds there.

11. *Myiophoneus temmincki*.—The Himalayan Whistling Thrush. [1871].

Frequents the mountain streams in Baluchistan, and undoubtedly breeds in their neighbourhood. I saw a pair, which must have been nesting close by, several times in the Sandeman Tangi near Ziarat. Several were shot in 1913 by Capt. Meinertzhagen, Royal Fusiliers, and 3 of his specimens are in the MacMahon Museum at Quetta.

12. *Molpastes leucotis*.—The White-eared Bulbul. [285].

Frequents the gardens and orchards in the Quetta Valley during summer, but not in large numbers. I think it certainly breeds there. It stays fairly late in the year, and I obtained a specimen in my garden in Quetta in November 1913. There are two specimens of this species in the MacMahon Museum in Quetta. I believe this species migrates to lower valleys, perhaps even to the plains of Sindh, during January, February and March. It appears to return in April.

SITTIDÆ.

13. *Sitta tephronota*.—The Eastern Rock Nuthatch. [322].

Very common about the valleys of Baluchistan, where there are running streams, and these birds build their curiously-shaped nests of mud against the rock-faces, and stick feathers, often of bright colours, on the outside.

apparently for ornament. I found many of these nests in the Hanna Valley, shaped like a large ball, with a tube leading into it. The birds build up the mud, when quite soft, and when sun-dried it gets like a sun-dried brick. I obtained one specimen near Urak in April 1913.

CERTHIIDÆ.

14. *Certhia himalayana*.—The Himalayan Tree-Creeper. [341].

Common at Ziarat, at 8,000 ft. and more, and it certainly breeds there in the Juniper Forest. I saw birds in nestling plumage there in July. I have also seen this species in the Quetta Valley in winter.

15. *Tichodroma muraria*.—The Wall-Creeper. [348].

Found throughout Baluchistan in the mountains, wherever there are rocky wall-faces, and it must, I think, breed there. Several specimens were shot in 1913 in the mountains near Quetta by Captain Meinertzhagen, Royal Fusiliers. There are two specimens of this species in the MacMahon Museum at Quetta.

SYLVIIDÆ.

16. *Acrocephalus stentoreus*.—The Indian Great Reed-Warbler. [363].

Not uncommon in the Quetta Valley along the bed of the Lora River, where it also probably breeds. I obtained a specimen in young plumage in my garden in Quetta in August 1913.

17. *Luscinola melanopogon*.—The Moustached Sedge-Warbler. [377].

I have never personally observed this species in Baluchistan, but one was shot in 1913 by Captain Meinertzhagen, Royal Fusiliers, and I saw this specimen in the MacMahon Museum at Quetta.

18. *Hypolais rama*.—Sykes' Tree-Warbler. [394].

Fairly common in the Quetta Valley in summer, and it breeds there in gardens and plantations. I found several nests and took one with 4 eggs on June 5th, 1913, in the Galbraith Spinney near Quetta. I also shot the cock bird, and sent the skin to the Bombay Natural History Society. This species migrated to the plains during winter. The nests are pretty little cups placed low down in bushes, often in a rose-bush or tamarisk bush.

19. *Sylvia jerdoni*.—The Eastern Orphean-Warbler. [399].

I found a small colony of this species near Kahan on the road from Kach to Ziarat, on July 10th, 1913, and obtained one specimen, which I sent to the Bombay Natural History Society. I think this species must breed in the locality mentioned. It has a very sweet and powerful song.

20. *Sylvia minuscula*.—The Small White-throated Warbler. [403].

I have not personally observed this species in Baluchistan, but Marshall speaks of small flocks of these birds occurring on migration in April. There is one specimen, said to be of this species, in the MacMahon Museum at Quetta.

21. *Phylloscopus tristis*.—The Brown Willow Warbler. [407].

I have never personally observed this species in Baluchistan, but Marshall states that he shot one in February in his garden, and there are

three specimens, said to be of this species, in the MacMahon Museum at Quetta.

22. *Phylloscopus indicus*.—The Olivaceous Willow Warbler. [408].

Fairly common in the neighbourhood of Ziarat, at 8,000 feet and upwards, in summer, and there can be little doubt that it breeds there. It has a peculiar note, which sounds like: "Chick!" "Chick!" "Chick!" repeated frequently and monosyllabically, and it is very restless in its habits. I obtained a specimen at Ziarat on July 6th, 1913, and sent it to the Bombay Natural History Society. In winter it migrates to lower elevations.

23. *Acanthopneuste nitidus*.—The Green Willow Warbler. [421].

A Willow Warbler was shot in Quetta Cantonments by Major Marshall in 1912, and I sent the skin to the Natural History Museum, South Kensington, where it was identified as this species. This was, I think, in October, and I observed others during the cold months of the year. I believe it to be a fairly common winter visitant, but I never observed it in summer.

24. *Scotocerca inquieta*.—The Streaked Scrub-Warbler. [445].

Common throughout Baluchistan in the low, thorny scrub bushes on the Mountain sides. It is a permanent resident all the year round and breeds in the scrub bushes. It is remarkable for its restless habits and for the peculiar way in which it constantly jerks its tail over from side to side. I obtained an adult specimen shot by Major Marshall in 1912, and shot a specimen in nestling plumage myself at Ziarat, at about 8,000 feet in July 1913.

LANIIDÆ.

25. *Lanius assimilis*.—The Allied Grey Shrike. [470].

Occurs in various parts of Baluchistan but is nowhere common. I obtained an adult specimen, shot by Major Marshall in 1912, and sent to the Natural History Museum, South Kensington, where it was identified as this species. It breeds in the Valleys between Kach and Ziarat, and on July 10th, 1913, I shot a young male specimen in nestling plumage about half-way between Kach and Kahan. I sent the skin of this specimen also to the Natural History Museum, South Kensington, where it also was identified as this species. There is one specimen of this species in the MacMahon Museum at Quetta.

26. *Lanius fallax*.—Finsch's Grey Shrike. [471].

I have not personally observed this species in Baluchistan, but Oates, on page 461 of Vol. I, of the Birds of India, states that Blanford obtained a specimen at Gwadar in Baluchistan, and there is a specimen in the MacMahon Museum at Quetta, said to be of this species.

27. *Lanius vittatus*.—The Bay-backed Shrike. [473].

Occurs in Baluchistan, but is, I think, nowhere numerous. It remains only during summer and migrates to lower-lying regions in winter. It breeds in Baluchistan. On June 19th, 1913, I found a nest of this species about 8 feet from the ground in a wild olive tree in the Galbraith Spinney near Quetta. I shot both the old birds, and took the 4 eggs. The female with the eggs and nest I presented to the MacMahon Museum at Quetta, and the male I sent to the Natural History Museum, South Kensington.

28. *Lanius erythronotus*.—The Rufous-backed Shrike. [476].

Very common in Baluchistan in summer, and it breeds in the gardens and plantations. I found four nests in my garden in Quetta in 1913. On June 19th, 1913, I shot a fine male in the Galbraith Spinney near Quetta, and this specimen I sent to the Natural History Museum, South Kensington. This species seems to be very rapacious, and I, several times, saw one of them with a young sparrow it had killed. They appear only to eat the brain and then spit the body on a thorn and leave it. This species only remains in the Quetta Valley from early in April till the end of August, and then migrates to lower elevations. There are several specimens in the MacMahon Museum at Quetta.

29. *Lanius isabellinus*.—The Pale-brown Shrike. [479].

Common in Baluchistan during summer and undoubtedly breeds there. I saw several in the neighbourhood of Ziarat in 1913 in July. Several specimens were shot by Capt. Meinertzhagen, Royal Fusiliers in 1913, and there is a specimen in the MacMahon Museum, at Quetta.

30. *Lanius phænicuroides*.—The Rufous Shrike. [480].

Common in Baluchistan during summer and like the foregoing species, undoubtedly breeds in the valley, between 6,000 and 8,000 feet above sea level. I obtained a specimen at Ziarat on July 9th, 1913, the skin of which I sent to the Natural History Museum, South Kensington, where it was identified as this species. Several specimens were shot in 1913, by Capt. Meinertzhagen, Royal Fusiliers, and there is a specimen in the MacMahon Museum at Quetta.

ORIOLIDÆ.

31. *Oriolus krundoo*.—The Indian Oriole. [518].

Occurs in Baluchistan in the summer months, and breeds in the valleys, but is nowhere common. On May 25th, 1912, I found a nest with 4 eggs, only slightly incubated, in a willow tree, about 18 feet from the ground, in the Galbraith Spinney near Quetta. I shot both the birds, and sent the skins and the eggs to a friend, who collects. There are 3 specimens of this species in the MacMahon Museum at Quetta.

STURNIDÆ.

32. *Pastor roseus*.—The Rose-coloured Starling. [528].

Common in Baluchistan. In summer it frequents the higher mountains and valleys, and I think it certainly breeds there. I shot a female at Ziarat at about 8,000 feet, on July 8th, 1913, and it had obviously been sitting on eggs. Several specimens were shot by Capt. Meinertzhagen, Royal Fusiliers, during 1913. During the coldest months this species migrates to lower elevations. There are 4 specimens in the MacMahon Museum at Quetta.

33. *Sturnus humii*.—The Himalayan Starling. [529].

I several times observed flocks, in the winter months, of a small species of Starling, in the Quetta Valley. I believe they were of this species. Marshall states that he shot one or two specimens of this species in March and April.

34. *Sturnus menzbieri*.—The Common Indian Starling. [532].

I have frequently observed this species in the Quetta Valley in flocks in the winter months, but obtained no specimens. There are three specimens of this species in the MacMahon Museum at Quetta.

35. *Acridotheres tristis*.—The Common Myna. [549].

In July and August 1912, I observed some small flocks of this species in the Quetta Valley, but I do not think it is anywhere a permanent resident, or that it ever breeds in Baluchistan, except perhaps in the low-lying portions adjacent to the plains of India. There are two specimens of this species in the MacMahon Museum at Quetta.

MUSICAPIDÆ.

36. *Musicapa grisola*.—The Spotted Fly-catcher. [557].

Common in the Juniper Forests at Ziarat at 8,000 feet and higher. It certainly breeds there as I saw many birds in nestling plumage there in June 1912 and July 1913. In winter it migrates to lower and warmer regions.

37. *Siphia parva*.—The European Red-breasted Fly-catcher. [561].

Frequents the Quetta Valley in April and in October, evidently during its migration. It is not seen during winter or summer, and I do not think any ever remain to breed in Baluchistan, but that they all pass on northwards for breeding. I saw this species frequently in my garden in Quetta during April and October. There are four specimens of this species in the MacMahon Museum at Quetta.

38. *Terpsiphone paradisi*.—The Indian Paradise Fly-catcher. [598].

I have never personally observed this species in Baluchistan, but have been informed by several competent observers that it occasionally frequents the gardens and orchards, and has been found breeding at Ziarat and elsewhere. There is one specimen of this species in the MacMahon Museum at Quetta.

TURDIDÆ.

39. *Pratincola caprata*.—The Common-Pied Bush-Chat. [608].

Common in Baluchistan during the summer. It breeds in all the valleys. I found a deserted nest with one egg in it in a hole in a bank on the road leading from Quetta to the Brewery in May 1912. In winter it migrates to warmer regions. I obtained a male specimen near the Galbraith Spinney, 2 miles out of Quetta, also in May 1912. There are three specimens of this species in the MacMahon Museum at Quetta.

40. *Pratincola maura*.—The Indian Bush-Chat. [610].

Common in the higher valleys of Baluchistan. I saw many at Ziarat in the summer at about 8,000 feet, and it undoubtedly breeds there, as I saw young birds in nestling plumage in June 1912 and July 1913. In winter it migrates to warmer regions. There is one specimen in the MacMahon Museum at Quetta.

41. *Saxicola picata*.—The Pied Chat. [618].

A summer visitant arriving in end of March and leaving in October. It breeds in all the valleys. Marshall records having found nests of this

species in April and May in holes among rocks. In winter it migrates to warmer regions. I obtained two specimens in 1912. There is one specimen of this species in the MacMahon Museum at Quetta.

42. *Saxicola capistrata*.—The White-headed Chat. [619].

I have observed this species occasionally, but it is nowhere common in Baluchistan, and I obtained no specimens. Marshall records having shot a specimen of this species in February near Sibi.

43. *Saxicola opistholeuca*.—Strickland's Chat. [620].

I have not personally observed this species in Baluchistan, but there is a specimen, said to be of this species, in the MacMahon Museum at Quetta.

44. *Saxicola barnesi*.—Barnes' Chat. [622].

Occurs in Baluchistan, but is never common. On November 15th, 1913, Capt. Meinertzhagen, Royal Fusiliers, gave me a fine male specimen just shot by him, and he got several other specimens the same day, all males. He saw no females. There is one specimen in the MacMahon Museum at Quetta, said to be of this species.

45. *Saxicola finschi*.—Finsch's Chat. [622A].

I have never personally observed this species in Baluchistan but in 1912, Major Marshall, Royal Garrison Artillery, brought me a specimen just shot by him, which I skinned and sent to the Natural History Museum, South Kensington, where it was identified as this species. I came across no other specimens of this species, nor did I hear of any others being obtained, while I was in Baluchistan.

46. *Saxicola isabellina*.—The Isabelline Chat. [625].

Common in Baluchistan from March to October and breeds there. Marshall records having found several nests with young birds in April, in holes in the ground, 2 feet or more in. This species migrates to warmer regions in the winter months. There are three specimens of this species in the MacMahon Museum at Quetta.

47. *Saxicola deserti*.—The Desert Chat. [626].

Occurs in Baluchistan during the winter months, but is, I think, never common. Most frequently seen in March. I do not think it breeds in Baluchistan. There is one specimen, said to be of this species, in the MacMahon Museum at Quetta.

48. *Saxicola montana*.—Gould's Chat. [627].

I have neither observed nor obtained any specimens of this species, but it must be found in various parts of Baluchistan, *vide* note by Oates on page 79 of Vol. II, regarding this species.

49. *Saxicola chrysopygia*.—The Red-tailed Chat. [628].

I frequently observed this species in the Quetta Valley during October and November. I never obtained any specimens, but I believe several were shot in 1913 by Capt. Meinertzhagen, Royal Fusiliers.

50. *Ruticilla erythronota*.—Eversmann's Redstart. [642].

Common in the Quetta Valley during the winter months, arriving in October, and leaving at end of March. I shot a fine male specimen on January 22nd 1912. There are 6 specimens of this species in the MacMahon Museum at Quetta.

51. *Ruticilla rufiventris*.—The Indian Redstart. [644].

Common in the Quetta Valley during the winter months, and like the foregoing species, is found all over Baluchistan from October to March, but in the higher valleys only in summer; and it certainly breeds at 8,000 feet and upwards, as I saw young birds in nestling plumage at Ziarat in June and July. There is one specimen in the MacMahon Museum at Quetta.

52. *Cyanecula suecica*.—The Indian Blue-throat. [647].

Common in the Quetta Valley during the winter months. I saw one in my garden as late as April 10th, but obtained no specimens. There are three specimens of this species in the MacMahon Museum at Quetta.

53. *Daulias golzi*.—The Persian Nightingale. [649].

I only once observed one of these birds in the wild state, and that was in my garden in Quetta in October 1913. These birds are frequently kept in cages in the Quetta Bazaar by natives, as they are beautiful songsters. These are all said to come from Kandahar. There is one specimen of this species in the MacMahon Museum at Quetta.

54. *Merula atrigularis*.—The Black-throated Ousel. [677].

Common in the Quetta Valley during the winter months, leaving in April and not returning until November. It is often seen in flocks. I shot a male specimen on January 22nd, 1912, in the Woodcock Spinney near Quetta. There are two specimens of this species in the MacMahon Museum at Quetta.

55. *Petrophila cyanus*.—The Western Blue-Rock Thrush. [693].

Fairly common in the higher valleys of Baluchistan in summer. I observed a good many, including birds in nestling plumage, between Kach and Ziarat in June and July. Marshall records finding a nest with 4 fresh eggs in April. There is one specimen of this species in the MacMahon Museum at Quetta.

56. *Monticola saxatilis*.—The Rock Thrush. [694].

I have not personally observed this species in Baluchistan. Marshall records shooting a female of this species in January and a male on 25th April. There are two specimens said to be of this species in the MacMahon Museum at Quetta.

57. *Turdus viscivorus*.—The Missel Thrush. [695].

Fairly common in the Juniper Forest at Ziarat, at 8,000 feet and upwards in summer, and I think it undoubtedly breeds there. I observed them frequently in June and July. Comes down into the lower valleys in winter.

58. *Tharrhaleus atrigularis*.—The Black-throated Accentor. [716].

A winter visitant only, in Baluchistan, as far as the lower valleys are concerned, though, I believe, I saw some at Ziarat in the summer; but I am uncertain of this, as I did not obtain any specimens there. I obtained a male specimen in my garden at Quetta on November 23rd, 1913. There is one specimen of this species in the MacMahon Museum at Quetta. Marshall records shooting a specimen near Quetta in January.

PLOCEIDÆ.

59. *Ploceus manyar*.—The Streaked Weaver-Bird. [723].

On July 17th, 1913, I saw a male and female of this species at Samungli, 4 miles west of Quetta, but having no gun with me at the time, I could

not shoot them. I believe, however, that these two birds must have escaped from cages in the Quetta Bazar, as I never saw or heard of any others being seen in the wild state, nor did I ever see any nests, which they invariably build in the country they frequent.

60. *Sporæginthus amandana*.—The Indian Red Munia. [738].

I frequently saw small flocks of this species in the Quetta Valley in late autumn, and in November 1911 I shot 2 females out of a flock in my garden, but did not get a male. There are four specimens of this species in the MacMahon Museum at Quetta.

FRINGILLIDÆ.

61. *Pycnoramphus carneipes*.—The White-winged Grosbeak. [743].

This species is common in summer at Ziarat at 8,000 feet and upwards, in the Juniper Forest, where it undoubtedly breeds. I shot a male and a female at Ziarat in June 1912, and gave the skins to the MacMahon Museum at Quetta. In winter this species descends to the lower valleys.

62. *Propasser grandis*.—The Red-mantled Rose-Finch. [757].

Common in summer in the higher valleys about Ziarat, at 8,000 feet and upwards where it certainly breeds, as I saw birds in nestling plumage in June and July. I shot a male specimen at Ziarat in June 1912, and gave the skin to the MacMahon Museum at Quetta. In winter this species descends to the lower valleys.

63. *Rhodospiza obsoleta*.—The Quetta Rose-Finch. [764A].

Common throughout the Quetta Valley where it breeds. I found a nest with young birds in a garden in May 1912. I obtained a fine male specimen in the Galbraith Spinney near Quetta on May 30th, 1912. There are 4 specimens of this species in the MacMahon Museum at Quetta.

Marshall mentions that Hume's Hawfinch is found in Baluchistan. In this, I think, he was mistaken, and that the bird he referred to was really "*Rhodospiza obsoleta*."

64. *Carduelis caniceps*.—The Himalayan Goldfinch. [767].

Common in the Quetta Valley during the winter months. In summer it ascends to the higher valleys, and is common at Ziarat at 8,000 feet and upwards, and, I think, must breed there, though I did not succeed in finding any nests. I obtained three specimens in my garden in Quetta in November 1913. There are two specimens of this species in the MacMahon Museum at Quetta.

65. *Metoponia pusilla*.—The Gold-fronted Finch. [771].

Common in summer at Ziarat, where it also breeds, as I saw many young birds in nestling plumage in June and July. I have seen this species in the Quetta Valley, even in winter. I shot a male at Ziarat in July 1913. There are two specimens of this species in the MacMahon Museum at Quetta. This species is very common in Baluchistan and other parts of the North-West Himalayas.

66. *Fringilla montifringilla*.—The Brambling. [774].

Common in Quetta during the cold months of winter, when it is seen in flocks in the gardens and spinneys. They arrive early in November, and

leave early in March. I shot a male in my garden in Quetta in November 1913. There are three specimens of this species in the MacMahon Museum at Quetta.

67. *Passer domesticus*.—The House Sparrow. [776].

Very common in Baluchistan at all seasons. It breeds in the eaves of houses, in banks, and in trees, etc. I shot several specimens at Quetta at different times of the year. There are two specimens of this species in the MacMahon Museum at Quetta.

68. *Passer hispaniolensis*.—The Spanish Sparrow. [778].

I have never personally observed this species in Baluchistan, but was informed by Mr. J. W. N. Cumming, Secretary, Baluchistan Natural History Society, that he had obtained several specimens in Baluchistan near Quetta.

69. *Passer montanus*.—The Tree-Sparrow. [779].

Common in Baluchistan at all seasons. It breeds in the eaves of houses, in hollow trees, etc. I shot several specimens, at different seasons, in my garden at Quetta.

70. *Petronia stulta*.—The Rock Sparrow. [782].

I have not personally observed this species in Baluchistan, but it undoubtedly occurs in Baluchistan. There is one specimen of this species in the MacMahon Museum at Quetta.

EMBERIZINÆ.

71. *Emberiza leucocephala*.—The Pine Bunting. [792].

I occasionally observed this species in flocks in the Quetta Valley during the winter months, but I never obtained any specimens. There are three specimens of this species in the MacMahon Museum at Quetta.

72. *Emberiza stewarti*.—The White-capped Bunting. [793].

Common during the Summer months in the higher valleys of Baluchistan. I found it common at Ziarat at 8,000 feet and upwards in July and June of 1912 and 1913, and found a nest with young birds in it in the latter half of June. I obtained a good male specimen on June 24th, 1912, at Ziarat.

73. *Emberiza stracheyi*.—The Eastern Meadow Bunting. [794].

I have never observed this species myself in Baluchistan, but it undoubtedly occurs there. In the MacMahon Museum at Quetta, there is one specimen, said to be of this species.

74. *Emberiza buchanani*.—The Grey-necked Bunting. [795].

I shot a male specimen of this species on August 21st 1913 at Samungli, 6 miles from Quetta. I never saw any other specimens of this species, but Marshall states that it is common in the hills in April.

75. *Emberiza luteola*.—The Red-headed Bunting. [800].

I saw several specimens of this species, early in July 1913, between Kach and Ziarat, and have no doubt that it breeds in that locality. Marshall states that he saw this species at Khelat. I think it is rather local in its distribution, and I never observed it in the Quetta Valley. There is one specimen of this species in the MacMahon Museum at Quetta.

76. *Emberiza striolata*.—The Striolated Bunting. [802].

I have not personally observed this species in Baluchistan, but Marshall states that it is not rare in the hills in summer, and probably breeds there, as he saw them at the end of June.

HIRUNDINIDÆ.

77. *Chelidon urbica*.—The Martin. [804].

I have occasionally observed Martins in the Quetta Valley, which I believe were of this species, but I never obtained a specimen. Marshall records that he shot one, which he identified as of this species, and gives its measurements as follows, *viz*: length $5\frac{7}{8}$ in., Wing $4\frac{1}{8}$ in., Tail $2\frac{3}{8}$ in.

78. *Ptyonoprogne rupestris*.—The Crag Martin. [810].

Common throughout the mountains of Baluchistan, where it breeds, though I personally never found any nests, but Marshall records finding nests in May and June with young birds in them. I have taken the nest of this species in Ladak.

79. *Hirundo rustica*.—The Swallow. [813].

Very common in Baluchistan in summer. It arrives in March, and migrates to warmer regions again in October. It breeds in the Quetta Valley in May, and it is quite a common thing to see these birds flying in and out feeding their young in their nests, built in the native shop-fronts in the main street of the Quetta Bazaar. during April and May. There is one specimen of this species in the MacMahon Museum at Quetta.

80. *Hirundo smithii*.—The Wire-tailed Swallow. [818].

Found sparingly in the Quetta Valley in summer, migrating to warmer regions again in the winter. I think it must certainly breed in Baluchistan, though I never found a nest, though I often saw the birds.

81. *Hirundo rufula*.—The European Striated Swallow. [824].

I occasionally observed a species of Striated Swallow in Baluchistan, which I believe was this one, but I never obtained a specimen. Marshall records that *Hirundo nepalensis*, Hodgson's Striated Swallow is fairly numerous round Quetta in summer, and that he found a nest. Perhaps he was right, but I took the species of striated swallow seen in the Quetta Valley to be *Hirundo rufala*, but it is impossible to determine this, without obtaining specimens.

MOTACILLIDÆ.

82. *Motacilla alba*.—The White Wagtail. [826].

Common in the Quetta Valley from October to April, but none are seen there in summer. There is one specimen of this species in the MacMahon Museum at Quetta.

83. *Motacilla personata*.—The Masked Wagtail. [829].

I occasionally observed this species in the Quetta Valley in winter, and also at Ziarat at about 8,000 feet in June and July, and I think it must certainly breed there, though I did not find any nests. It appears to be nowhere common at any season.

84. *Motacilla melanope*.—The Grey Wagtail. [832].

I observed this species occasionally in the Quetta Valley in winter, but obtained no specimens. I think it probably breeds in the higher valleys. There is one specimen of this species in the MacMahon Museum at Quetta.

85. *Motacilla borealis*.—The Grey-headed Wagtail. [833].

I occasionally observed this species in the latter half of March and early in April in the Quetta Valley, but obtained no specimens. There is one specimen of this species in the MacMahon Museum at Quetta.

86. *Motacilla beema*.—The Indian Blue-headed Wagtail. [835].

I have not personally observed this species, but there appears to be no doubt that it visits Baluchistan during its winter migration. There is one specimen in the MacMahon Museum, said to be of this species.

87. *Motacilla feldeggii*.—The Black-headed Wagtail. [836].

I saw several specimens of this very handsome and distinctly-coloured little Wagtail near Tarin Shahr, about 2 miles north of Quetta, in November 1912, and also in other localities in the Quetta Valley. This species like several other Wagtails, only passes through Baluchistan in its winter migration, and does not stay to breed. Those I saw in November had very black heads, though Oates says the head is black in summer plumage.

88. *Motacilla citreoloides*.—Hodgson's Yellow-headed Wagtail. [838].

I frequently observed this species in the Quetta Valley during the winter months, but especially in the months of migration, October and March, I do not think it ever breeds in Baluchistan. I obtained two specimens, shot by Major Marshall, Royal Garrison Artillery, in November 1912. It is possible that *Motacilla citreola* may also pass through Baluchistan, but in winter plumage it is difficult to distinguish it from *M. citreolides*.

89. *Anthus trivialis*.—The Tree-Pipit. [840].

This species is occasionally to be seen in the Quetta Valley during the winter months, but I do not think it is ever common anywhere in Baluchistan, nor does it, I think, ever stay to breed there.

90. *Anthus similis*.—The Brown Rock-Pipit. [844].

This species is common at Ziarat, at 8,000 feet and upwards in summer and certainly breeds there. Marshall records finding a nest with young birds on May 11th. I obtained no specimens, but several were shot in 1913, by Capt. Meinertzhagen, Royal Fusiliers. I frequently saw this species in the hills round Quetta, but never in the Quetta Valley itself. It appears to migrate to lower elevations in winter, but of this I am not quite certain.

91. *Anthus rosaceus*.—Hodgson's Pipit. [850].

At Ziarat in June and July I frequently observed a Pipit, which I believe to have seen this species, but as I obtained no specimens I was unable to make certain of this. The birds, I saw, were certainly breeding at about 9,000 feet.

92. *Anthus spinoletta*.—The Water Pipit. [851].

I have not personally observed this species in Baluchistan, but I believe it habitually passes through Baluchistan on migration. There are 2 specimens, said to be of this species, in the MacMahon Museum at Quetta.

93. *Oreocorys sylvanus*.—The Upland Pipit. [853].

I have never personally observed this species in Baluchistan, but there is a specimen, said to be of this species, and shot at Quetta, in the MacMahon Museum at Quetta.

ALAUDIDÆ.

94. *Alaemon desertorum*.—The Desert Lark. [854].

Found sparingly throughout Baluchistan at all seasons and certainly breeds there. I saw one in the winter of 1911-12 in the Quetta Valley, and I obtained a fine male specimen in the Upper Zhob Valley in April 1891.

95. *Melanocorypha bimaculata*.—The Eastern Calandra Lark. [859].

Frequents the Quetta Valley in summer and I think breeds there, though I never found a nest. There is one specimen in the MacMahon Museum at Quetta.

96. *Alauda gulgula*.—The Indian Sky-Lark. [861].

Common in Baluchistan, and certainly breeds there. Marshall records that *Alauda arvensis* is common in the Quetta Valley. I think it is probable, that both species are common as they are so much alike as to be almost indistinguishable one from the other.

97. *Calandrella acutirostris*.—Hume's Short-toed Lark. [861].

Common in the Quetta Valley, more so in winter than in summer, but I think it probably breeds in Baluchistan. I obtained a good specimen on August 7th, 1913, near the Nar reservoir, west of the Hunna Valley, and about 6 miles from Quetta. Marshall records that *Calandrella brachydactyla* is common round Quetta in the winter, so I think that probably both species are common.

98. *Galerita cristata*.—The Crested Lark. [874].

Very common in Baluchistan at all seasons, and breeds there. I found many nests, one found on May 11th, 1912, had 5 eggs in it which I took. I shot the male bird near the nest, and preserved the skin. There is one specimen of this species in the MacMahon Museum at Quetta.

99. *Ammomanes phænicuroides*.—The Desert Finch-Lark. [878].

Common throughout the foot-hills stretching from the mountain ranges into the open valleys of Baluchistan, at all seasons of the year. It also certainly breeds in Baluchistan, though I never succeeded in finding a nest. I obtained a specimen of this species above the Staff College, and below Kitchener Hill, about 3 miles from Quetta on August 7th, 1913.

PROGRESS OF THE MAMMAL SURVEY.

Owing to the War and the departure of our three collectors Mr. Shortridge, Capt. Macmillan and Major Mayor for the front we have not much progress to report in this Journal.

Mr. Crump—the only remaining Collector—has completed his work in Sikkim and amongst those who have rendered him great assistance, mention must be made of Mr. R. S. Lister and Mr. C. H. Dracott, C.E., of Gangtok. Both of these gentlemen and also Mr. H. Stevens are carrying on the work and are obtaining specimens for us. After finishing Sikkim, Mr. Crump collected at Darjeeling on the Eastern border of Nepal. He then descended to Kurseong and Siliguri and is now at Jalpaiguri where his tour will end, as he is leaving India to proceed to England to join the Army.

We feel sure that members whilst regretting the circumstances which have taken all our trained collectors from the work of the Survey, will understand and applaud the spirit which they are showing. Much as we desire to complete the Mammal Survey of India and Burma we know that members will recognize with us the fact that the War must come before the Survey. We hope that when the War is finished our collectors will return to complete the Survey.

As we had some of the skimmers on our hands we thought it advisable to continue the work on a small scale and therefore in December we sent Mr. S. H. Prater, the head assistant in our Museum, on an experimental trip to the Koyna Valley, Satara District, to collect Mammals. Mr. Prater was away about a month and 20 days and made an interesting collection of about 420 specimens. On his return, as he was anxious to continue the work, we sent him in March to the Upper Sind Frontier. Mr. Prater went first to Jacobabad and Kashmir. After collecting there he left for Sukkur and Khairpur State. He then proceeds to Larkhana and after that comes South to Hyderabad (Sind) and Karachi. Up to date Mr. Prater has obtained some 500 specimens in Sind.

The Society also received an offer of the services of Mr. R. Shunkar Narayan Pillay to collect Mammals for them in Travancore and Southern India and we decided to avail ourselves of this opportunity as specimens from S. India are desirable for comparison with those from Ceylon. Mr. Pillay commences work in May.

The following list of Mammals which are urgently required is given in hopes that members resident in any of the districts

mentioned will try and collect specimens and so help to carry on the Survey while our collectors are at home. This list does not mean that other kinds of Mammals are not wanted but only that the ones mentioned are specially required at the present time. Any specimens other than those mentioned will be most acceptable and useful. The specimens may be made into flat skins but the sex and date of capture should be noted. The skull should be kept and numbered to correspond with the skin and only roughly cleaned and dried:—

South India.—Indian Wolf, Fox, Hedgehog, Flying Squirrels, Muntjac.

Malabar.—Malabar Civet Cat, Fishing Cat.

Eastern Ghats.—Tree Shrews.

Bombay Presidency.—Indian Wolf, Hedgehog, Tree Shrew, Hare, Muntjac.

Deccan.—Indian Wolf, Fox, Wild Dog, Porcupine.

Dangs.—Flying Squirrel, Large Indian Squirrel.

Rajputana.—Desert Fox, Wolf, Desert Cat, Porcupine.

Punjab.—Desert Fox, Wolf, Hares, Hedgehogs.

North-West Provinces.—Wolves, Foxes, Hares, Porcupines.

Kashmir.—Mongoose, Marmots, Foxes.

Central India.—Wolves, Hares, Muntjac.

Central Provinces.—Muntjac, Tree Shrews.

Bengal.—Wolves, Foxes, Porcupine, Wild Pig.

Sunderbunds.—Muntjac, Leopard Cat, Porcupine.

Lower Bengal.—Hares, Muntjac, Leopard Cat, Foxes, Porcupine.

Behar and Orissa.—Wolves, Porcupines, Hares, Tree Shrews, Muntjac.

Singbhoom.—Flying Squirrel.

Assam.—Flying Squirrel, Pallas's Squirrel, Himalayan Monkey, Muntjac.

Goalpara.—Hoolock.

Cherripungi.—Bamboo Rat.

Burma.—Hares, Flying Squirrels, Wild Dogs.

Arakan.—Bamboo Rat, Flying Squirrels.

Rangoon.—Flying Squirrel.

Pegu.—Hare, Ferret Badger, Mongoose.

If members are unable to obtain any of the above animals themselves perhaps they will let others know what skins we are in want of.

To give members some idea of the results achieved by the Mammal Survey we give below a list of all the species described through the work of the Survey. This list contains (1) specimens collected by the Society's collectors, (2) specimens collected by members and sent in through our collectors, (3) specimens already in the British Museum which have been described through the help of the Survey specimens.

It should be kept in mind that the results of the Survey are not merely to be judged by the number of new species described but also by the additions to our knowledge of distribution, variation, &c.

When the Volume on Mammals in the Fauna was written many species were, and in some cases are known only, from very few specimens. This has led to a want of clearness in some descriptions and the unnecessary massing or dividing of certain species. Since the above Volume was written new species have been described from time to time and some of them the collections of the Survey have shown cannot hold good.

CIVETS.

Banded Palm Civet . . *Hemigalus derbianus incur-* Bankachon, Tenasse-
sor. rim.

MUNGOUSES.

Pale-grey Mongoose . . *Mungos mungo pallens* . . Palanpur.
Small yellow Mongoose.. *Mungos auropunctatus hel-* Deesa.
vus.

BATS.

The Obscure Bat . . *Kerivoula crypta* . . Shimoga, S. India.
Tuft-tailed Pipistrelle . . *Pipistrellus lophurus* . . Maliwun, Tenasse-
rim.
Northern Dwarf Pipis- *Pipistrellus nimus glaucil-* Multan.
trelle. lus (3).
Peyton's Bat . . *Myotis peytoni* . . Gersoppa Falls, Ka-
nara.
 Myotis sicarius (3) . . N. Sikkim.
 Leuconæ peshwa (3) . . Poona.
The Greater Indian *Rhinopoma kinneari* . . Cutch.
Mouse tailed Bat.

SQUIRRELS.

Vassal's Flying Squirrel. *Petaurista annamensis* (3). Bali, S. Annam.
Taylor's Flying Squirrel. *Petaurista taylori* (2) . . Bankachon, S. Tenas-
serim.

Venning's Flying Squirrel.	<i>Petaurista venningi</i> (2)	..	Kalaw, S. Shan States.
Blyth's Flying Squirrel.	<i>Sciuropterus phayrei probus</i> ,		Mt. Popa.
	<i>Sciuropterus phayrei laotum</i>		Laos Mts., Siam.
	(3).		
Coorg Giant Squirrel ..	<i>Ratufa indica superans</i>	..	Watekolli, Coorg.
The Black-shouldered Giant Squirrel.	<i>Ratufa indica centralis</i>	..	Bori, Hoshangabad, C. P.
Irrawaddy Squirrel ..	<i>Sciurus pygerthrus janetta</i> .		Mandalay.
N. Shan States Black-backed Squirrel.	<i>Sciurus atrodorsalis shanicus</i> .		Gokteik, N. Shan States.
	<i>Sciurus sladeni midas</i> (3).	..	Myitkyina.
	„ „ <i>ruber</i> (3)	..	Lonkin, Myitkyina Dist.
	„ „ <i>bartoni</i> (3).		Uya R. U. Chindwin.
	„ „ <i>solutus</i> (3).		Homalin.
Adamson's Red Cheeked Squirrel.	<i>Dremomys rufigenis adamsoni</i> .		Kalaw, U. Burma.
Yunnan Red Cheeked Squirrel.	<i>Dremomys rufigenis ornatus</i> (3).		Yunnan.
Berdmore's Squirrel ..	<i>Menetes berdmorei decoratus</i> .		Mt. Popa.
	<i>Menetes berdmorei mocre-scens</i> (3).		Bali, Annam.
	<i>Menetes berdmorei consularis</i> (3).		Bangkok.
Coorg Jungle Squirrel ..	<i>Funambulus wroughtoni</i>	..	Srimangala, Coorg.

MICE and RATS.

Wroughton's Tree Mouse.	<i>Vandeleuria wroughtoni</i>	..	Patal, Surat Dist.
Sandy Red Tree Mouse..	<i>Vandeleuria oleracea spaldicea</i> .		Lunawa, Palanpur.
Kumaon Tree Mouse ..	<i>Vandeleuria oleracea modesta</i> .		Ramnagar, Kumaon.
Ruddy Tree Mouse ..	<i>Vandeleuria oleracea rubida</i>		Bageshwar, Kumaon.
Flower's Tree Mouse ..	<i>Vandeleuria sybylla</i> (3)	..	Siam.
The Northern Field Mouse.	<i>Leggadilla dunnii</i> (3)	..	Ambala.
The smaller Ashy Spiny Mouse.	„ <i>cindrella</i>	..	Cutch.
Phillips' Spiny Mouse ..	„ <i>phillipsi</i>	..	Nimar.
Coorg Hill Spiny Mouse.	„ <i>grahami</i>	..	Wokoli, S. Coorg.
Coorg Lowland Spiny Mouse.	„ <i>hanningtoni</i>	..	Makut, S. Coorg.
Burmese Spiny Mouse ..	„ <i>shortridgei</i>	..	Mt. Popa.
Grey Spiny Mouse ..	„ <i>surkha</i>	..	Vijayanagar, Bellary.
	„ <i>bahadur</i>	..	Karwar, Kanara.
Mysore Spiny Mouse ..	„ <i>siva</i>	..	Sivasamudram, S. Mysore.
Nepal Spiny Mouse ..	„ <i>gurkha</i>	..	Jerna, Kumaon.
Burmese Field Mouse ..	<i>Mus cooki</i>	..	Gokteik, N. Shan States.
Mayor's Rat ..	<i>Coelomys mayori</i>	..	Ceylon.

MAMMAL FUND.

FURTHER LIST OF SUBSCRIPTIONS UP TO 30TH APRIL 1915.

Name.	Amount.		
	Rs.	A.	P.
Amount previously acknowledged in Journal No. 2			
Vol. XXIII	85,641	14	7
Bell, T. R., I.F.S.	100	0	0
Forsyth, Dr. Wm.	5	12	0
LeMesurier, H. P.	15	0	0
	85,762	10	7
	Rs.	A.	P.
Interest credited by Bank on current			
Account up to 31st March			
1915	404	13	8
„ B. P. T. Bonds up to 31st			
March 1915.. .. .	379	9	4
„ Fixed Deposit up to 31st			
March 1915	1,259	6	5
	2,043	13	5
PROMISED.			
FEDERATED MALAY STATES GOVERN-			
MENT \$ 1,000=	Rs.	1,750	
GOVERNMENT OF BIHAR AND ORISSA ..	„	1,500	
	3,250	0	0
	91,056	8	0

The subscription to the Mammal Survey Fund up to date amounts to Rs. 85,762-10-7 added to which we have Rs. 2,043-13-5 for interest earned and Rs. 3,250 promised making a total of Rs. 91,056-8-0. The expenditure up to date amounts to Rs. 77,320-14-4, leaving a balance in hand and invested of Rs. 10,485-9-8.

REVIEWS.

BIRDS OF THE INDIAN HILLS.*

There is a great want of a book on the Common Birds of India with popular descriptions of the different species. Mr. Dewar's new book on the "Birds of the Indian Hills" to some extent fills this want as far as the Himalayas and the Hills of Southern India are concerned. It is true a number of the birds described are also found in the plains but on the other hand many are not mentioned which are common there, but for these the enquirer can refer to Eha's "Birds of Bombay."

Part I.—Starts with a general chapter on the habitat of Himalayan birds. Mr. Dewar then gives a list of the Common Birds he observed in Kumaon, taking that district as representative of the Western Himalayas. This is followed by an account of the birds noted in the Eastern Himalayas, but descriptions are only given of those species not mentioned in the previous chapter. There are some short chapters on special birds such as the Black Bulbuls, the Spotted Forktail, the Great Himalayan Barbet, &c., all of which Mr. Dewar has something interesting to tell about.

Part II.—Consists of a list of the Common Birds found in the Nilgiris, made chiefly round the Hill Stations of Coonoor and Ootacamund and should enable the visitor to name most of the birds seen in the garden or during the course of a ramble. For the benefit of visitors to the Palni Hills a list of the common species is included in Part III. This, however, unlike the other lists, is not made on Mr. Dewar's personal observations, but is based on a paper by Dr. Fairbank written some 40 years ago in *Stray Feathers*. With these four lists we can safely say that the visitor to the Himalayas or South Indian Hills should be able to recognize most of the more conspicuous birds likely to be met with. In some cases however the observer is bound to be disappointed in not finding a particular bird but it is impossible in a popular book to mention all the species. The fact whether a bird is common or not and should be included in such list as Mr. Dewar's is difficult to decide as it depends to a great extent on the powers of observation of the observer, still we think Mr. Dewar has made a very good selection.

† INDIAN FOREST INSECTS.

"*Indian Forest Insects of Economic Importance, Coleoptera*," is the title of a recent work by Mr. E. P. Stebbing, late of the Indian Forest Service. Mr. Stebbing, it may be mentioned, for some years occupied the position of Zoologist in the Forest Research Institute at Dehra Dun. The author informs us in the preface that the chief aim of the book is the study of the Insect Fauna of the Indian forests from the economical standpoint. Presumably this volume is the first instalment of a series as it deals only with the Beetles.

The book as it is published is too large for easy handling and the paper is of that shiny sort which is so trying to the eyes when there is a strong light upon it. It would have been better had it been of the ordinary quarto size, published in two parts. The print is, however, very clear and good and the illustrations are excellent. Many of these latter, particularly the figures of the insects themselves, have been published before in various places; many

* Birds of the Indian Hills, by Douglas Dewar, London, John Lane, 1905, six shillings net.

† Indian Forest Insects, by E. P. Stebbing. Published by order of His Majesty's Secretary of State for India in Council. London. Price fifteen shillings.

of them are new ; they are all remarkably good likenesses of the originals and will therefore be of considerable value for identification purposes. The enlarged pictures of the smaller insects appertaining to the families *Platypodidæ*, *Scolytidæ*, *Curculionidæ*, *Bostrychidæ* and others will be very useful for ease of reference to enable future enquirers to recognize known enemies of forests and to distinguish between them. The photographs of wood sections, trunks of trees, &c., showing the style of damage done by these enemies in India ought also to be of considerable worth.

It would have enhanced the value of the book if Mr. Stebbing had a systematic key to the different families and sub-families mentioned in it. They are not numerous and it would not have been difficult to do so. It is the same with the genera and species dealt with. The descriptions of the perfect insects, grubs and pupæ are very meagre and will, in the majority of cases, be useless for identification purposes but this objection is, to a great part, mitigated by the excellent figures, where these are given. There is a goodly number of insects mentioned of which only a damaged specimen unfit for identification has ever been obtained by the author, there are some even of which only the grub has been seen. These might have been omitted without anything being lost. There is also a good deal of unnecessary repetition.

On the whole "Indian Forest Insects" is a book which, if it does not go very far towards filling an empty gap in Indian forest literature, we must recognize as a very laudable effort towards supplying a distinct want. And, as such, we should welcome it. It is but a beginning ; in the words of the author, "a pioneer intended to indicate to others the lines upon which further study of the subject should proceed." At the best of times the number of students of these forest zoology matters is limited and, up to date, there have not been many works of reference to help them on their way ; such as exist besides are written in French and German requiring a more or less intimate knowledge of those languages for their perusal. There may of course be English translations but, even then, they would not be of much use ; Indian and European conditions being so different that most of what is written in them would have only a limited application out here. So Mr. Stebbing is to be congratulated on having made a beginning ; and, considering the difficulties that always present themselves in beginnings, in having done so with considerable success, notwithstanding the imperfections from lack of material and information inherent in all new ventures of the sort. Perseverance and courage deserve recognition and we have evidence of both these in the present work.

Therefore, as a stimulus to the study of forest insects and their ways, this book is of considerable value. As a work of real, practical utility, it will, we fear, have little scope. And this is due to two causes, both of which are outside the author's influence. One is dependent upon the state of forests management in general out here in India, the other is attributable to the paucity of insects mentioned. The prescriptions for dealing with insect pests could never be applied on any large scale owing to the expense entailed, the difficulty of obtaining sufficient labour at the proper time in most localities, the want of establishment and the ignorance of the people. They could be carried out only in plantations and in isolated forests of limited extent where effective supervision is possible and the means of transport are always at hand. Such conditions exist only in comparatively negligible areas. The other cause can only be removed by years of entomological study. Although numbers of insects are known to the systematic scientists there are still very many that are not ; and, except for the life histories and habits described for certain beetles in Mr. Stebbing's present book, little has been published, because little is known of their ways,

inter-relations and influence upon forests. Most of the life histories, even, that we find in the book are incomplete and will have to be confirmed and amplified before they can serve any useful purpose. Some 480 *Coleoptera* are enumerated as of forest importance. Of these some 56 have been described by the author personally and five others bear his name. Of the first number some will be found, we think, to have very little to do with damage to forest growth either directly or indirectly as, for example, *Hydrophilidæ*, *Silphidæ*, and *Tenebrionidæ*.

On reading through the book somewhat hurriedly and with the further disadvantage of not having existing notes to refer to at the moment, we may mention various points that occur to us in connection with what is written therein. Under "Damage done to Roots" on page 12, *Phassus malabaricus* and other *Hepialidæ* or Ghost-Moths have been omitted; they are well known root-borers and sometimes do much damage to *Trema orientalis* in Bombay. Another species damages plants of the genus *Strobilanthes*. It is more than probable both attack more important species as well and their extraordinary fertility would point to their being enemies to be feared where they occur. *Duomitus ceramicus* also attacks fig trees of many species (page 14). Under "Damage to Buds" it may be noted that weevils bore into and breed in many of them. Under that to "Inflorescences" the damage done by butterfly larvæ of the lycænid genera *Virachola* and *Rapala* which occur all over India might have been mentioned. The imagines of the former lay their eggs on the flower and the larvæ resulting live in the fruit which they completely destroy; the larvæ of the latter eat flowers. Both exist sometimes in large numbers. The statement advanced tentatively at the bottom of page 31 about the generations of parasitic insects has much support in fact. In many cases we know that the generations of host and parasite are equal in number and each of practically equal duration. On page 40 the *Arbela* larva is mentioned, seemingly as somewhat exceptional in that it feeds on the bark of more trees than one. The fact is not exceptional at all. There are very few larvæ of *Lepidoptera* that are confined to one single foodplant and, we may therefore infer, few coleopterous larvæ either. Hundreds of instances could be adduced proving this. In fact we imagine that it will be found eventually that the number of insects that are confined to a single species for their food are very few in number.

This fact—that the foodplants of all insects may be varied—will be one of the chief difficulties of preventing or combating attacks on forests by such enemies; and when we consider that there is hardly a forest in India outside the pine and sal areas that do not contain dozens of species, all mixed up together, of timber-trees, climbers and creepers and useless soft woods that are as often as not closely related to each other, the difficulties can well be imagined by the most uninitiated. Take, for example, the case of the teak-pest, *Pyrhausta machæralis*, that occurs sometimes in such numbers as to skeletonize every leaf on every teak tree in tracts of 200 miles in length by 50 in breadth. It is called the Teak Defoliator. But the larva—it is the larva that does the damage—feeds upon any member of the botanical family *Verbenacæ* and, may be, upon other plants as well; it would, therefore, be a very difficult problem to devise any practical means to combat or prevent attacks even in an isolated area, let alone in an extensive teak forest. On page 50, this very insect is said to pupate on the ground and, on the next page, we are told that the best way to destroy it is to fire the forest; the prescription may be all right for a small area where the fire can be kept under absolute control and where conditions of the ground-cover lend themselves to such control but, ordinarily, such a method would be out of the question and its application over an extended area would

surely be fraught with far more disastrous effects than could possibly accrue from the attack of the pest. Besides, *Pyrhausta machæralis* larvæ do not by any means all pupate on the ground. They do so under webs on the leaves themselves, and the moth emerges before these fall; or in crevices in the bark of the trees, and that at all heights. We might mention that pupæ of *Hyblæa*, mentioned on the same page, are also found, as often as not, in cells made on the leaves.

On page 63, at the top, we find the statement that a large species of *Elater* is found in dead *Xylia* trees and the fact is mentioned in connection with wood-boring beetles. We do not know any wood-boring beetles belonging to the *Elateridæ* though a number of them live in decaying, nearly rotten wood; there is a very large species which lives in *Tamarix* in Sind, where it is predaceous upon a prionid larva.

Anthia sexguttata mentioned on page 173 will kill and eat anything it can master. It is not, generally, a forest species, however; being far commoner on black cotton soil in the plains and open places than in forests. Many larvæ of the malacodermatous fireflies (page 180) feed upon snails, and a large one we are acquainted with will demolish four of considerable size in a single day; so that they might be considered to be of some use to plant-life in destroying one of the enemies thereof. *Belionota prasina* (page 217) attacks *Terminalia paniculata* and *T. belerica* in the Bombay Presidency, as well as other trees. *A propos* of the Family *Cantharidæ* (page 246) nothing is mentioned about the interesting life histories of which several have been fully described by Fabre and others. The species are seemingly all parasitic and their hosts are bees, wasps or grasshoppers of different kinds. The eggs are generally laid in the earth, in little pits made for the purpose, which are afterwards filled up by the mother-beetle and then left to themselves. After a time each egg gives birth to a curious, extremely, active, little larva, known as a *triangulin* from its legs each ending in three claws. These run about on the surface of the ground or climb up into flowers, etc., until, in the latter case, they meet a bee, into the hairs of whose body they can fasten; or, in the former case, until they can burrow into a nest of some particular species of wasp or into the egg-chamber of some grasshopper. The bee carries the little larva away with it to its home where the latter gets on top of an egg, which has been laid on the honey. It sticks to this egg until it has fully consumed it, carefully avoiding contact with the liquid; then it changes into a comparatively formless grub of a quite different shape, adapted to float. Consuming all the honey thus, it changes into a pseudo-pupa, then into an active-looking larva again and, subsequently, into a true pupa before emerging as a beetle. The bees selected are, as far as is known, such as make nests in the earth. The development follows the same sequence in the case of larvæ that burrow into the egg-nests of locusts. *Mylabris** will probably also burrow as *triangulin* into the soil though it is not known upon what eggs it feeds. *Cissites* (page 249) is found in the larval state in nests of species of *Xylocopa* in India. Whether the eggs are laid actually in the borings made by the bees; or whether they are laid in the earth as in other species, giving birth to similar active larvæ which climb up into flowers from which the bees rifle the pollen to make their honey, is not known. It would be interesting to know. It is probable that the genus *Xylocopa* generally is subject to attack by both the species of *Cissites* mentioned as, in Sind, *testaceus* was found in the borings of a different species to *latipes*. The fact that the beetles of the genus *Cantharis* (*Epicauta*) are found in great numbers in one spot will, we think, be found to depend upon the insect upon which they prey existing there in large numbers combined.

* Mr. Bainbrige Fletcher in "Some South Indian Insects" just published notes that *Mylabris* sp. actually does this.

with an equal period of development for the individual beetles. It has been observed that many species do occur in enormous numbers together here in India though we cannot, off-hand, remember their names. We remember, however, to have seen hundreds and hundreds of perfect insects of *Cissites debyi* of all sizes crawling about the ground in Khandesh in the year 1902—all in one place, in the month of April.

Estigmena chinensis (page 254) is also found in Bombay where it is extremely common in the bamboo jungles, attacking, as mentioned, *Dendrocalamus strictus*. The bamboo is, however, so plentiful that its depredations are of little consequence. Its habits are as stated by Mr. Stebbing. The genus *Crioceris* affects Lilies to a great extent; *Cryptocephalus* eats the leaves of many different trees. The larvæ are soft grubs and the latter lives in hard, spherical or ovoid cocoons while the former covers itself with a soft covering of its own excreta. There is a *Haltica* (page 261) that is very common in Bombay in the hills in forest country; it frequents hot nalla-beds and feeds on the leaves of *Homonoiariparia* and *Salix ichnostachya*. It is sometimes found in such numbers that the underside of every leaf of the thickets of bushes in spaces of 100 sq. yards is absolutely covered with them. The species is known but, in the absence of notes, cannot be given here. *Aspidomorpha sanctæcrucis*, like others of the genus, will be found on all *Convolvulaceæ*, on the underside of the leaves on which the larvæ feed. These larvæ are of the ordinary form, with processes, and an upturned, fan-shaped brush of excreta shading the back. *Sthenias grisator* (page 377) attacks the branches of *Chloroxylon swietenia*, the Satinwood tree, in Bombay, ringing them as described, so that they fall to the earth; branches of nearly an inch in diameter are thus killed and much damage done to young stool-shoots. *Larinus*? sp. (page 411). This is probably the same beetle as the one described, by Dr. Heller of the Dresden Museum in the year 1902, from larvæ and beetles procured in Khandesh. The name is again wanting in the absence of notes. *Cyrtotrachelus* (page 440). There is a species of this occurring commonly in the south of Bombay which is probably the same as *longipes* that attacks bamboos; also another one, black in colour.

Now we come to the *piece de resistance* of the book—chapters XX and XXI, treating of the family *Scolytidæ*. These chapters are really good and nearly altogether original: descriptions, life-histories, parasites and all. And Mr. Stebbing is to be particularly congratulated upon having brought the study of so many species of small insects of all but exclusively forest importance to so advanced a stage. He enumerates 76 species—some of them, it is true, not complete as to identification or description, but these are in the large minority—of which he has discovered and described no less than 44 himself. The treatment of this family alone justifies the publication of his work in the present form and affords ample evidence that he made good use of the time he was able to devote to entomology in India.

There are two misprints in the book; one on page 16, line 7 from the bottom where *Bistria* is a mistake for *Biston*; the other on page 18 where *mangiferæ* should read *mangifera* in the second line.

MISCELLANEOUS NOTES.

No. I.—NOTES ON THE HABITS AND COLOURATION OF
THE WHITE-HANDED GIBBON (*HYLOBATES LAR*, L.).

Blanford notes that *H. lar* is said to drink by scooping up water with its hand, but all the specimens I have seen in confinement drank in the ordinary way by putting their lips to the water.

The brown form was the most numerous in this District, only about one in ten being black, while none of the very pale or bright yellow varieties were observed. In *lar*, black individuals may be either males or females, but as Blanford notes, in 'hoolock' black males and brown females appear to predominate. In Western Australia male red kangaroos (*Macropus rufus*) are normally red and the females greyish-blue, the females however are very frequently red, and the males may occasionally be blue. Towards the North-West the 'blue doe' entirely disappears, both sexes becoming similar in colour. It is just possible that the variable colouration of the gibbons may be analogous in a still more irregular degree.

But I think there is little doubt that the black individuals that occur both in this species and 'hoolock' are melanistic, and that brown is the normal colour in both sexes. The white eyebrows in 'hoolock' and the white circle, hands and feet in *lar* being, like the tail tip of an Australian opossum, characters that are not affected by melanism.

It may be noted that the black varieties of both the grey and ring tail opossums are most plentiful in the thick coastal belt of South-Western Australia, while even the common grey kangaroos are distinctly darker within that tract. In India the panther is without doubt most frequently melanistic in the forest, especially the evergreen forest regions, black panthers being in the Peninsula extremely rare away from the thick jungles that clothe the Western Ghats—much of which is evergreen, they become more numerous however to the East of Bengal and still more so in the evergreen tracts of Tenasserim and the Malay countries. The forest dwelling gibbons are possibly affected in the same way as the panther, while the black forms of *Ratufa* occurring to the East of Bengal, Ceylon and the extreme South of India may have originated in a similar manner though in this case the changes have become specific. What influence evergreen forests can have in encouraging melanism it is difficult to say, but it may have something to do with the much greater darkness or the constantly moist atmosphere and greater rainfall. At all events I believe that for some unknown reason there is a distinct tendency for many Indian mammals to become melanistic in evergreen forest areas, especially as the Malay countries are approached where the forests are entirely evergreen.

G. C. SHORTRIDGE.

RANGOON, 1914.

No. II.—THE WHITE-BELLIED FLYING SQUIRREL
IN GARHWAL.

I see in report No. 15 of the Mammal Survey a note on *Petaurista albiventer* in which it is stated that this species is exceedingly local.

If I am not mistaken in the species—and I think I am not—I think the above is hardly correct. Presumably Garhwal is not included in the writer's interpretation of Kumaon, but it adjoins it and if *P. albiventer* is common here it must be common there.

In Garhwal this squirrel is very common, I should say wherever forest of *Q. incana* and *Q. dilatata* abounds, though it is local to the extent that it moves about wherever its food happens to be, which I believe is principally acorns.

A month ago I camped in a forest at 8,000' which was simply swarming with them—eating acorns of the above two species and as I had never before shot one I shot three, all males.

I took their measurements if they are of any interest to you—

Total length to end of tail without hair	..	32"	30"	32½"
Tail only without hair..	..	15½"	14½"	17"
Weight in lbs. . . . .	..	2¾	2½	2¾

I kept the skins and two skulls and if you thought the above of sufficient interest and that there should be any doubt as to its correct identification I could send a skin and skull for you to see though I could not do so for some months as I sent away these skins in a box to Naini Tal to await my arrival.

In Naini Tal there is another species of flying squirrel, grey all over as far as I remember and less than half the size of *P. albiventer*.

A. E. OSMASTON.

CAMP *via* PAURI, GARHWAL,

25th December 1914.

[The Society's collector only collected in Kumaon, principally in the eastern part. Mr. Osmaston has sent a skin which is certainly *P. albiventer*. The smaller species is probably *Sciuropterus fimbriatus*, but no specimens were obtained by Mr. Crump.—EDS.]

No. III.—NOTES ON TIGERS IN TENASSERIM.

In the tiger, recorded in the Tenasserim Report, a porcupine quill was found, nearly four inches long, entirely embedded in the back of the head. Porcupine flesh appears to be very attractive to tigers and panthers and the scattered quills of examples that have been killed and eaten are quite frequently found in the jungle. I have also occasionally found remains of pangolins which were probably killed by the same animals. It is curious how unsuspicious tigers become where they are not much shot. In the present case a half grown buffalo had been killed and in the course of the following day the carcass was entirely stripped by vultures, nothing but the skeleton being left. When I arrived I found that the bones had been gathered together, tied into a bundle with rope and dragged nearly a hundred yards to the foot of a clump of bamboos in which a "machan" had been built. The buffalo had been in open "Taungya" country and there was no other cover for several hundred yards with the exception of a belt of low scrub. The tiger came to the kill at about 5 p.m. and dropped to a lethal bullet which entered the neck at an angle and smashed the far shoulder blade. On another occasion near Bankachon two hurricane lamps were left on the ground, as the moon was rising late, one on either side of a kill, in order to keep the tiger away during the early part of the night. When the tiger arrived, however, it dragged the kill away, evidently taking no notice of the lamps.

G. C. SHORTRIDGE.

RANGOON, 1914.

No. IV.—ALTITUDE TO WHICH ELEPHANTS ASCEND.

In your current issue Capt. Molesworth asks if elephants have ever before been observed at 10,200 ft. elevation. Though I have never seen them myself, a number of people who know the Kalimpong district have told me that elephants are frequently seen on Rechila at high elevations and the following note in the margin of my copy of the "Fauna of British India" may be of interest. The book originally belonged to the late Mr. Tinne of the Forest Department and the note is in his handwriting:—

"They (elephants) go at all seasons of the year to the top of Rechila and Sathila in British Bhutan, 10,060 ft., to feed on the Maling bamboo (*Arundinaria racemosa*) and I think, to escape the mosquitoes and other pests in the Dooars. I have found fresh tracks at most seasons of the year, even through 2 ft. of snow in April 1907 when the season was unusually late. As the approach to the summit is extremely steep they must have a regular track, probably crossing from side to side of the Neora (Narchu) river. From the tracks they appear to wade into the ponds found at 9,200 ft. but not extensively. They probably also graze on the small grassy meadows which cap Rechila where bamboo and rhododendron grow."

E. O. SHEBBEARE, I.F.S.

JALPAIGURI, BENGAL, 15th December 1914.

No. V.—THE GREAT PAMIR OR MARCO POLO'S SHEEP
(*OVIS POLI*).

"Ye emperors, kings, dukes, marquises, earls, and knights and all other people desirous of knowing the diversities of the races of mankind, as well as the diversities of kingdoms, provinces, and regions of all parts of the East, read through this book, and ye will find in it the greatest and most marvellous characteristics of the peoples especially of Armenia, Persia, India and Tartary, as they are severally related in the present work by Marco Polo, a wise and learned citizen of Venice, who states distinctly what things he saw and what things he heard from others. For this book will be a truthful one." So wrote Rustigiela, a citizen of Pisa, at the dictation of Marco Polo, in A.D. 1295, both being then prisoners of war in Genoa. In A.D. 1324, Marco Polo lay upon his death bed, being then some 70 years of age, and was exhorted by his friends as a matter of conscience to retract what he had published, or at least to disavow the parts that were fictitious. He then said that so far from having exaggerated, he had not told one-half of the extraordinary things of which he had been an eye-witness. This claim has been fully substantiated by every traveller who has traced the footsteps of the great Venetian, but to this day little more is known of Marco Polo by the majority of my countrymen, than that his name was given to the great sheep which is the subject of the present article, and his travels are placed in the same category as those of Sir John Mandeville, and de Rougemont. Yet those travels contain all that is known about an empire that once extended from the Black Sea to the Pacific, and from the Arctic into Burma. The tide of its conquests spent its force among the myriads of China and India, and it is now hard to realise that in the 13th and 14th centuries there was a destructive force at work in Northern Asia, which might have exterminated the entire population of Europe.

In the course of his journey from Persia to Peking, Marco Polo crossed the mountain range that lies between the head-waters of the Oxus and the City of Kashgar. "Here, between two ranges, you perceive a large lake,

from which flows a handsome river, that pursues its course along an extensive plain, covered with the richest verdure. Such indeed is its quality that the leanest cattle turned upon it would become fat in the course of ten days. In this plain there are wild animals in great numbers, particularly sheep of a large size, having horns three, four, and even six palms in length. Of these the shepherds form ladles and vessels for holding their victuals; and with the same materials they construct fences for enclosing their cattle, and securing them against the wolves, with which they say the country is infested, and which likewise destroy many of these wild sheep or goats. Their horns and bones being found in large quantities, heaps are made of them at the sides of the road, for the purpose of guiding travellers at the season when it is covered with snow. For twelve days the course is along this elevated plain, which is named Pamir; and as during all that time you do not meet with any habitations, it is necessary to make provision at the outset accordingly. So great is the height of the mountains, that no birds are to be seen near their summits; and however extraordinary it may be thought, it was affirmed that from the keenness of the air, fires when lighted do not give the same heat as in lower situations, nor produce the same effect in dressing victuals." Carlyle remarks that the traits which were noticed by Julius Cæsar among the Gauls, were to be found among the French at the Revolution. At the present day near the head of the Taghdumbash Pamir is a camping ground called Kukturuk. Thence a river flows the entire length of that Pamir. Ten miles below Kukturuk close to the left bank of that river is a sheepfold, and it has pleased the Kirghiz who constructed that sheepfold to make its walls entirely of the horns of *Ovis poli* twisted in among large boulders. This is good evidence of the truth that Marco Polo wrote.

The Pamirs can easily be reached from Europe by means of the Trans-Caspian railway, but I know nothing about this route.

The only other practicable way of reaching the Pamirs is from India. There are two feasible routes, *via* Gilgit, and *via* Leh and Yarkand. However the Leh route is so long and the passes open so late in the year, that it would really be waste of time for any sportsman to attempt to shoot on the Pamirs unless he has obtained permission from the Government of India to travel *via* Gilgit. The shorter journey is also infinitely more beautiful and interesting than the longer one.

I regret to say that game on the Taghdumbash Pamir is now very scarce indeed. The game list comprises *Ovis poli*, ibex, wolves, bear, and snow leopard, and the two last are so rare as scarcely to count, and although I travelled all over the Pamir, I only saw one decent herd of ibex, which was in the Paik Nullah. I calculate that on June 1st, there would be 200 head of *Ovis poli* on the Pamir, of which 50 would be in the nullahs round Kukturuk, 50 in the Paik Nullah and 100 in the Kunjerab. It is an interesting fact that two miles of the head of the Kunjerab Nullah are in British territory, so that *poli* is a permanent resident of our Empire. The record *poli* head is 75 inches, and the sportsman is allowed to shoot 4 heads. However he will be most fortunate if he shoots a single head of 50 inches, and I would not hesitate to shoot anything of 45 inches. I myself only secured a single head of forty inches in 5 weeks, and only missed once, so that it is open to ask whether the game is now worth the candle. On the other hand my companion got two heads of over 45 inches in ten days, and heads of 50 inches are still to be had. The reason for this is obviously overshooting. Guns are not much in evidence in the summer, but the winter is the shooting season for the Kirghiz and one sees skulls literally by the hundred that one would give anything to possess as a legitimate trophy. Indeed one

need only visit the Pamirs to understand how a species becomes extinct. My own opinion is that about 20 out of those 200 heads will be 45 inches and over. The rest will be immature males as it is a singular fact that scarcely a female lives on the Taghdumbash. This separation of the sexes is a peculiarity which *poli* share with the Tibetan antelope and markhor, but among markhor the sexes at least occupy the same valley. My 40 inch *poli* weighed 237 lbs., stood 45 inches, and was 81 inches in length, of which 4 inches was tail. The colour is a sort of bluish-fawn, with a good deal of white, which rather gives him away. They frequent the grassy slopes at the very heads of the valleys, right under the glaciers. Their senses of sight, smell and hearing are most acute, and although the ground on which they live is not usually difficult, they generally frequent open spaces, where it is hard to approach within less than a quarter of a mile. Like all hill game they are best stalked from above if it is possible to manage it. They generally feed until 10 A.M. when they lie up until 4 p.m., usually on the feeding ground unless they have become suspicious. I never saw them singly, but a herd may be anything from 4 up to 20, and often consisted entirely of small heads. When scared they go up hill, and although their tracks are obvious enough, they travel so far that it is not worth while to follow them. One should leave one's camp as soon as it is light enough to see, as it is easier to stalk them when they are feeding than when they are lying down. One always rides a yak until one has seen one's game, and hillmen have such keen eyesight that it is rare to jump a herd. When one has sighted the herd it is most difficult to tell the size of the heads. The horns are so pale in colour as to be almost invisible and look smaller than they really are. A 40-inch head makes approximately a full circle, and anything better than that is worth shooting. They have a habit of digging shallow pits to keep out of the wind, but are cute enough to keep their eyes above the ground level. When at rest the various members of the herd graze in all directions, and they graze up wind, so always seem to feed away from one. The Paik Nullah, where I first went, seemed to me particularly unfavourable for stalking, owing to the large open spaces and lack of ravines. The Kukturuk nullah is easy stalking ground, but I saw next to nothing there, though a previous sportsman had missed a big head. If I had my choice now, I would take the Kunjerab, as the ground is fairly good for stalking, and there is enough ground and enough game for ten days shooting, whereas one would have scared all the game out of the Paik Nullah or Kukturuk in less than a week.

W. B. COTTON, I.C.S.

BASTI, U. P., 23rd November 1914.

NO. VI.—THE ASIATIC TWO-HORNED RHINOCEROS
(*RHINOCEROS SUMATRENSIS*, Cuv.).

As far as I have been able to find out *Rhinoceros sumatrensis* and *sondaicus* occur in Southern Tennasserim in about equal numbers, and the many enquiries I have made seem to show that both species are equally well known to the natives, while they appear to exist in the same situations and to be similar in habits, although in the Dutch Indies I was always told that *sondaicus* was much more of a mountain animal than *sumatrensis*. Besides the Rhinoceros I shot I have only heard of two other instances of a Rhinoceros being shot near Victoria Point by a European, one of these specimens, of which I have seen the skull, was *sondaicus* obtained some years ago by Captain McCormick, a former planter in the district, but it is only

too well known that they are persistently hunted by Siamese and Chinese shikaris, who shoot them over water holes during the dry season for the sake of the valuable medicinal properties they are supposed to possess, which without doubt accounts for their scarcity, the thick jungles and comparatively sparse population where they still exist being probably the only things that have prevented their extermination long ago. One Siamese shikari near Victoria Point is said to have accounted for *sixteen* Rhino, probably a very high percentage of those existing in the whole district. The continued watch a native shikari is able to keep over the water holes throughout a considerable area must cause tremendous destruction among these animals and a dead Rhino is said to be worth Rs. 1,000, a fortune to most shikaris. Unfortunately, as in other places, although game laws are enforced strictly enough among Europeans, they are quite unable to cope with the secrecy with which a native is able to carry on his hunting, and although there may not be a large number of guns in the district, if there is only one in a village it is idle to suppose it is not at the disposal of any one who wants it.

The Chinese, Burmese and Siamese preserve practically every part of a Rhinoceros. The horns, hoofs, blood, urine, hide and even the intestines being dried and afterwards converted into various medicines.

Rhinoceroses are said to occasionally swim from the mainland to some of the islands near the coast, but which species, or whether both, do it I have been unable to find out. I have been told that once as many as eight were seen together on one of these islands, but this must have been a very exceptional instance, as in addition to their scarcity I believe them to be rarely, if ever, intentionally gregarious, going about as a rule in pairs and possibly often wandering about singly, although a pair will probably keep in touch and meet in the course of the night.

For its size a Rhinoceros does not leave a big track although easy to follow owing to the pits made in the ground by their toes. I had many opportunities of following and observing Rhinoceros tracks both at Bankachon and Maliwun. The usual thing is evidently for a pair to frequent a district for a month or so, and then to move off somewhere else, their movements being probably affected by the water-supply. They apparently do not care for clear running streams and are said only to visit the low ground during the hot season when their drinking pools in the hills have dried up. Where there are plenty of well beaten tracks 'wallows' will occasionally be found which besides being drinking places are used for rolling in, owing to which habit they are always covered more or less thickly with a coating of mud which probably serves as a protection against mosquitos. Two 'wallows' found were quite small, more or less oval in shape, about 8 feet by 6 and full of stirred up mud, one near Maliwun had evidently been much used and deserted quite recently having probably got too dry. Tracks led off in all directions, the surrounding jungle was very thick and the tracks presented the appearance of large tunnels, while the trunks of standing and fallen trees and even the undergrowth for several hundred yards in every direction were white with dry caked mud, which had been rubbed off by the constant passing backwards and forwards of at least a pair of these animals.

The track made by a Rhinoceros is quite different to that of an Elephant. Where an Elephant will break a path a Rhinoceros will make a tunnel, even creepers three or four feet from the ground stretching across their path will not be broken but burrowed under.

They are evidently largely ground feeders, a number of large citrous fruits resembling oranges, merely bitten in half and swallowed, being found in the stomach of the specimen shot. With the exception of these, the stomach contained green vegetable matter, probably the fallen leaves of the same tree.

They may also feed on bamboos, but in their feeding places there is not the same amount of broken down vegetation as there is where an Elephant has been feeding.

On January 7th, two Gurkhas and I who had been doing a lot of hunting in the district, although not previously succeeding in finding any fresh Rhino tracks, came upon some that were evidently more recent than any thing else we had seen. We followed them for a few miles going slowly as in several places we came to where the animal had evidently been feeding as the tracks would circle about and cross themselves in every direction. Towards evening, as we were about five miles from camp, I decided to camp where we were for the night and follow on again next morning, half hoping that something would turn up during the night, as besides Rhino we had noticed tracks of Elephant, Sambur and Pig. It must have been well after twelve, as the moon which was very small had almost set and we had turned in having given up hopes of seeing anything that night, when we were awakened by a series of loud snorts which we at once guessed must be from a Rhino, that sounded quite close, although when first heard they were probably over a hundred yards off. The animal must have scented us or been suspicious of something from the very first, though as there was no wind it was quite unable to locate us. If it had done so it might have made straight off, instead of which it began making a series of short rushes, crashing into trees and altering its direction so often that it was difficult to tell if it was gradually coming our way or not; between each rush it would become quite silent for several minutes, probably listening, and then start off in some new direction, at one time we were able to locate it exactly, as the path a short distance away was partly under water and we heard the splashing as it crossed this spot, but although so close there was so little light that we were unable to see anything and for a short time it apparently increased its distance from us. It is astonishing how quietly even a Rhino can move when it chooses, as at last without any warning it suddenly crashed out of a bush almost on top of us. As the moon had almost set it was impossible to see the sights of my rifle so I was depending on a shot gun loaded with lethal bullet and dropped him at 7 paces with a lucky shot in the head, which smashed through the zygomatic arch and into the skull, the bullet being afterwards found inside the brain in about a dozen pieces, several of the circular steel discs used in the construction of the bullet having entirely detached themselves from the lead covering.

Several hours later when we had turned in for the second time we were awakened in exactly the same manner by a second Rhino, the snorts however coming this time from another direction, the moon had been down for some time and it was impossible to see a yard. This animal did not rush about like the first one but came along the track and had just crossed that part which was under water, when it must have either seen some movement or scented the dead Rhino, as it turned suddenly without the slightest warning and bolted, crashing through branches and hitting its feet against stones and tree trunks as it went, making as much noise as an Elephant, and on getting about a hundred yards away, it started squealing in a most extraordinary manner, the noise very much resembling that made by a dog caught in a trap.

The next day we found a 'wallow' a few hundred yards off which the tracks we had been following evidently led to.

The meat was most excellent, very like beef and remarkably tender, and not at all coarse or stringy like that of a sambur or a bison.

G. C. SHORTRIDGE.

RANGOON, 1914.

No. VII.—OCCURRENCE OF THE BARKING DEER (*MUNTIACUS VAGINALIS*) AND A FEW OTHER ANIMALS IN KATHIAWAR.

I notice in Report No. 10 of our Society's Mammal Survey of India, that it is stated by Mr. Crump, the Collector, that the Barking Deer is found in the Gir, and that one evening he heard one barking (*vide* page 471, Vol. XXII, No. 3, of the Journal).

I am quite confident that Mr. Crump must have been mistaken, for at different times, I have camped for weeks together in the Gir, where I was continually wandering through every nook and corner of it, but I never came across, or even heard, of a Barking Deer. I have also spent many weeks in the Gírnár, the Barda Hills, and the Tánga or jungle country around Chotila to the north and west of Rajkot, but everywhere, the deer in question, was conspicuous by its absence.

The Four-horned Antelope (*Tetraceros quadricornis*) which in the local vernacular is called *Guntâda* (not *Guntla*) is common enough in the Gir, but the bucks rarely carry more than the two posterior horns. The latter are also to be found in the Gírnár and the Barda Hills, but are comparatively scarce in both these localities.

Mr. Crump also remarks that he was unable to obtain any information regarding the Ant-eater (*Manis crassicaudata*). They are exceedingly scarce, but *are* to be found in Káthiáwár. I only saw one during the 17 years I was there, which was brought to me by a local *Wágri* at Rájkot.

Another animal of which Mr. Crump was unable to obtain any information, is the Hunting Leopard (*Cynælurus jubatus*). I have never heard of one in the Gir but it is hardly the kind of country they prefer. The only localities where I have heard of their ever having been seen or shot, are in the Tánga country extending from Thán under Lakhtar, eastwards through Chotila, Chobári Bábra, right away across Jasdan Somnath, to the neighbourhoods of Vinchia and Tasdan. Mr. S. A. Strip of Wadhwán Camp shot one some 20 miles or less south of Wadhwán. The only live ones I saw during my sojourn in Káthiáwár were two which I helped to spear in the neighbourhood of Rajkot where they had undoubtedly wandered from the districts I have already mentioned.

L. L. FENTON, LIEUT.-COL.

MARSH HALL, SOUTH MOLTON,
N. DEVON, 23rd November 1914.

No. VIII.—THE BALEEN OF THE GREAT INDIAN FIN-WHALE (*BALÆNOPTERA INDICA*).

In the last number of the Society's journal mention was made of a whale (*Balænoptera indica*) which was stranded at Viziadrug in the Ratnagiri District. Mr. Crump, as was mentioned, was sent to obtain measurements of this whale but unfortunately it was too far gone for him to obtain any. He however brought back a number of blades of baleen and the accompanying block is a photograph of some of these blades. The largest blade measures about 26" in length, the bristles being about 7" more and the breadth at the base is about 9" and in colour it was bluish-black. Numerous illustrations of the baleen of different whales have been published but we have not access to any at present except the one which appeared in Mr. Orjan Olsen's paper on the newly described S. African whale (*Balænoptera brydei*), Bryde's whale, in the P.Z.S., 1913, p. XII. This plate shows that the bristles of the



common Rorqual (*Balænoptera borealis*) are very different to those of *B. brydei*, in the former the bristles are comparatively short and much curled while in the latter they are longer, thicker and quite straight. In the accompanying block it will be seen that in this respect the baleen of *B. indica* resembles much more closely that of *B. brydei* than *B. borealis*. In shape also the baleen of *B. indica* seems to resemble that of *B. brydei*. Mr. Olsen suggests that on account of the coarseness and shape of the bristles of *B. brydei* "it would hardly be possible with its imperfect straining apparatus to keep back such small crustaceans as the *Calanidæ* which form the principal food of *B. borealis*." He also mentions that the food of *B. brydei* consists chiefly of fish, usually a variety of the herring, but that it also takes small sharks and one Captain reported to him the finding of 15 large penguins and a gannet in the stomach of a Bryde's whale.

N. B. KINNEAR.

BOMBAY, 30th March 1915.

NO. IX.—THE ORANGE-BELLIED CHLOROPSIS IN THE KATHA DISTRICT, U. BURMA.

I saw a pair of these birds, which I afterwards shot, in a tall tree in evergreen and bamboo jungle 2,000 ft. up in the hills some 20 miles east of Wuntho station, Katha district; they were apparently feeding on insects among the leaves and my attention was drawn to them by the twittering whistle they were making, very similar to that of the other chloropsis. I have not seen any more of this species. Harington records this bird as occurring in the Upper Chindwin, but he does not mention it in his Bhamo lists.

C. E. MILNER, I.F.S.

SHWEBO, 20th January 1915.

No. X.—THE KING VULTURE (*OTOGYPS CALVUS*) IN SIND.

I found the nest of the King Vulture to-day. The bird was sitting on it. I hunted her off and found a young bird in the nest. The nest was built in the top of a small dead babul tree about 35 feet from the ground. The tree was close to an old bed of the river Indus, in which there was still some water. It was in the Murid Rais forest of the Hyderabad Division.

My reason for communicating the above is that Murray (Vertebrate Zoology of Sind) says of this bird, "said to breed on inaccessible cliffs from January to April", and Barnes does not seem to have found a nest in Sind.

E. G. OLIVER,

Dy. Conservator of Forests.

KARACHI, *March 17th*, 1915.

[Many of the statements in Murray's Vertebrate Zoology of Sind are not to be relied on. Dr. Jerdon in his Birds of India wrote that this species "is said to usually breed on inaccessible cliffs" and though this statement was hardly correct it was copied into the "Vertebrate Zoology of Sind." The King Vulture nearly, if not always, nests in trees, sometimes even on bushes where there are few trees. In the Eastern Narra the King Vulture was not uncommon as a breeding species in Doig's time.—EDS.]

No. XI.—WOODCOCK (*SCOLOPAX RUSTICULA*) IN THE EASTERN GHÂTS.

The enclosed photographs will no doubt interest you.

The birds were shot at Salabam, which is situated on the Eastern Ghâts, at an elevation of about 4,000 ft., Lat. N. 18°-10', Long. 82° 45', on 26th February by Mr. L. T. Harris, I.C.S.

He was just about to photograph a little pool in the jungle when his peon called his attention to the woodcock and he hastily exchanged the camera for his gun, and was lucky enough to get it.

P. H. ARBUTHNOT.

VIZAGAPATAM, *5th March* 1915.

[We are unable to reproduce the photograph of the Woodcock. There are few records of Woodcock on the Eastern Ghâts so this note is of considerable interest.—EDS.]

No. XII.—SNIPE IN LOWER BURMA.

A few notes on the Snipe season in Lower Burma during the year 1914 might be of interest. The season was very poor. According to my diary, there appears to be a steady decline since 1909-10, these two years having been excellent. In 1913, birds, especially "fantail," stayed very late. On the 30th November I got 26 couple, in two short outings in December 28 couple, and at the beginning of 1914, on the 24th January, a couple of hours produced 26 couple; my last few snipe (5 couple) being shot as late as 10th April. I saw 3 or 4 birds on the 26th April, but lost the one I had managed to get in thick jungle. Towards the end of August birds started arriving, rather later than usual, as the 13th might be taken as average for the last seven years. Owing to a record rainfall most of the grounds were under water, and on the few higher situated fields birds were few and very wild. I believe only one good bag of 51½ couple was obtained by one gun, on the

11th October near Ledaunggan, when mostly pintail, but also a few fantail were found plentiful on the banks of certain little creeks near the Poozoundanag Creek.

Sundry "late" grounds, which invariably are good in December, are still too wet, even at time of writing, but another fortnight's sun should dry them up sufficiently, and probably a few small bags will be obtained then.

I saw, and obtained, several Swinhoe's Snipe (*G. megala*), though on the whole they are rare; I am inclined to believe that they show a decided penchant for jungle grounds. The last I shot, 26th December, was obtained near Palon, about 50 miles up the Prome Railway line, on the edge of a large jheël (Hlahamahget-su), situated in the middle of thick jungle, and I obtained here also, on that day, a Wood-Snipe (*G. nemoricola*); this latter species is also none too plentiful here, being only the second that I have shot during the last ten years. I once saw another, but missed. Jack-snipe are still rarer, I fancy, as I have only seen one, which I got near the Poozoundanag Creek on the 14th September 1910.

In my mind I am quite certain that, given favourable conditions, snipe breed in Lower Burma occasionally, though I have not yet succeeded in finding a nest. I have however shot on several occasions early in the season quite young birds with plumage not sufficiently developed to enable them to travel any distance; besides, these young birds were in excellent condition, whereas the first arrivals in August are invariably on the "light" side. I have not kept any skins, but shall make a point of keeping one or two (provided I come across them) this year, and forward them to you in proof of my argument.

E. O. BLOECH.

RANGOON, 20th January 1915.

NO. XIII.—THE COMPARATIVE WEIGHTS OF FANTAIL AND PINTAIL SNIPE.

The question of the comparative weights of Fantail, *Gallinago caelestis* and Pintail Snipe, *G. stenura* was recently under discussion. My experience of these in Southern India is that the Pintail appears to be the bigger bird. One man said that the authorities (he referred to the Fauna of British India) on the subject did not bear this out. I find that in Hume and Marshall's "Game Birds" the average weight of both sexes of Fantails is given as 4.2 oz. (Vol. III, p. 369) while that of Pintails is given as 4.06 oz. (Vol. III, p. 356).

Curiously enough on the former page there is a note from a Mr. J. C. Parker in which he gives weights which makes out the Pintail to be on the average 1 oz. heavier than the Fantail. Mr. Hume, however, does not seem to have been much impressed.

Jerdon's Birds of India, Vol. III, p. 675, gives the weight of Fantails as ranging from $3\frac{3}{4}$ to 5 oz. but gives no weight for Pintails. The weights given in Vol. IV, pages 287 and 290, of the Fauna of British India are said to have been taken from Hume and they agree with those given.

Finally on pages 549 and 579 of Volume XX of the Bombay Natural History Society's Journal, the weights are given as from Hume.

It would be interesting to find out if this difference in weight varies with different localities. I have been weighing these birds recently, and the average weight of 135 Fantails comes to 3.513 oz. while that of 472 Pintails

comes to 4.014 oz. The birds have been weighed on return home about 5 p.m. generally in groups of four on a parcels balance which can be read to about $\frac{1}{4}$ oz.

The average weight throughout the season will also be ascertained to see if there is much variation.

R. F. STONEY.

MADURA, S. INDIA, 18th January 1915.

No. XIV.—GHARIAL, *GAVIALUS GANGETICUS*, AND PORPOISE, *PLATANISTA GANGETICA*, CATCHING IN THE INDUS.

I do not know whether any account of the Gharial (long snouted Crocodile) catching people of the Indus has ever been published, but in case it may be of interest I send you an account of an experience I had a few days ago.

Knowing that I wished to see the tamasha, my men sent for some Kehals to my camp on the bank of the river. About 300 yards away was a sandbank at the down stream end of which the Kehals staked some nets, these did not show above water, were only some 2 or $2\frac{1}{2}$ feet deep and did not seem to be particularly strong; two Kehals then went and concealed themselves some little way up stream. Not very long after, one by one, 3 gharials came out to sun themselves on the sandbank. After waiting in vain for a little for more to come the two Kehals showed themselves and the gharial darted into the water, the Kehals raced up and seized on their nets and hauled out two of the three, small ones, but they assure me that their nets will hold the very biggest.

I was also told of their method of catching porpoises which I did not attempt to see for myself. The *modus operandi* is as follows:—A spot where the water is about 4 ft. deep and the current not strong is selected and a platform is erected. At sunset the fisherman takes his post on the platform accompanied by a tame otter and armed with a casting net, a stake and a live fish—the stake is fixed at a convenient distance from the platform and the fish is tethered to the stake. The tame otter seeing the live fish cries for it and it is allowed to go into the water but not to reach the fish. According to the Kehals the porpoise hears the otter call or smells it and comes to help in its fishing—it then sees the tethered fish and, losing all caution in its anxiety to get to the fish before the otter, makes a dash and gives the fisherman the opportunity to cast his net over it. This sounds a good fisherman's story but they assure me that success is by no means infrequent.

R. M. LOWIS, LT.-COL.

DERA GHAZI KHAN, January 1915.

[Hume in *Stray Feathers*, Vol. 2, says that he was told in the Punjab that the otter was tied to a post in the water and that the porpoises were caught as they came to attack it! Later he found that this story was made up and an intelligent Mhor told him that when a herd of porpoises were located at night, a tame otter was made to work the water, like a dog, and drive all the fish towards the bank. The porpoises seeing the fish dash at them and are caught by men standing in the water with a special kind of net.

Any member in the Punjab or Sind who has seen porpoises caught might send us a note for the Journal, as no first hand account of their capture has as far as we know been published.

The Society also is much in want of skeletons and skulls of this porpoise.—EDS.]

No. XV.—NOTE ON THE 'MUGGER' *CROCODILUS PALUSTRIS*;
CONTENTS OF THEIR STOMACHS, FOLKLORE, Etc.

The following are the records of the contents of the stomachs of two specimens shot in the Bilaspur District, Central Provinces.

A small specimen 4'-5" long inhabiting a Jheel contained the following:—

- 32 Water Beetles, *Cybister confusus*.
- 15 Giant Water Bugs, *Belostoma indicum*.
- 4 Opercula of *Ampullaria*.
- 14 Paddy grains.
- 16 Small stones.

A large specimen 10'-8" long (tail docked) inhabiting the Twlsua Nuddy and which was shot in the afternoon, only contained the following:—

- 1 Large Frog, *Rana tigrina*.
- 6 Large stones.
- 12 Small stones.

The weight of this latter specimen was about 440 lbs. and it was with some difficulty taken out of the water while still alive by means of bill-hooks, bamboos, etc. After it was safely landed, the natives engaged in the process fell to discussing crocodiles in general; they alleged that these reptiles swallowed one stone every year and thus the age of a specimen could be ascertained by the number of stones found in its stomach. They also believed that after the creature has reached maturity the tail gets shorter year after year by the casting off of one of the vertical blades at the distal end of the tail. They said that there used to be a very old individual in an adjoining stream which had only two vertical blades left. It was venerated by the villagers near its haunts because it had never attacked a human being. It was subsequently killed by a Gond with his bow and arrow. It is worthy to remark that a large number of muggers one sees have their tails docked. Young specimens with complete tails have about 19 upright blades while some large adult ones have only 8 or 10.

They said that the villagers in the vicinity would be greatly pleased to hear of the destruction of this crocodile as the larger specimens were in the habit of drawing their cattle into the water while they went to drink. A crocodile, they also remarked was not one to let go its grip once it got hold of anything and while this specimen was being drawn ashore they warned each other to keep at a respectable distance from its mouth. This nuddy they alleged was full of muggers and through fear of them, fishing in it was out of the question.

E. A. D'ABREU, F.Z.S.

CAMP, BILASPUR DISTRICT, C. P.,
21st January 1915.

No. XVI.—THE THORNY TAILED LIZARD.

Those who reside in the arid and sandy plains of the Punjab must have observed and become familiar with the lizard depicted in the photograph, which is that of *Uromastix hardwickei*.

There are seven species of this lizard, which are found inhabiting Northern Africa and South Western Asia and unlike other lizards are clearly distinguished by the fact that the front teeth, instead of being small and conical, are in the adult large and united into one or two broad cutting teeth, separated from the cheek series by a gap. They are externally easily recognised by the absence of any crest along the back, or of folds or pouches in the neck, and by their short tails covered with well defined rings of spiny scales. Their heads are short and round, the body depressed, and the apertures of the ears exposed.

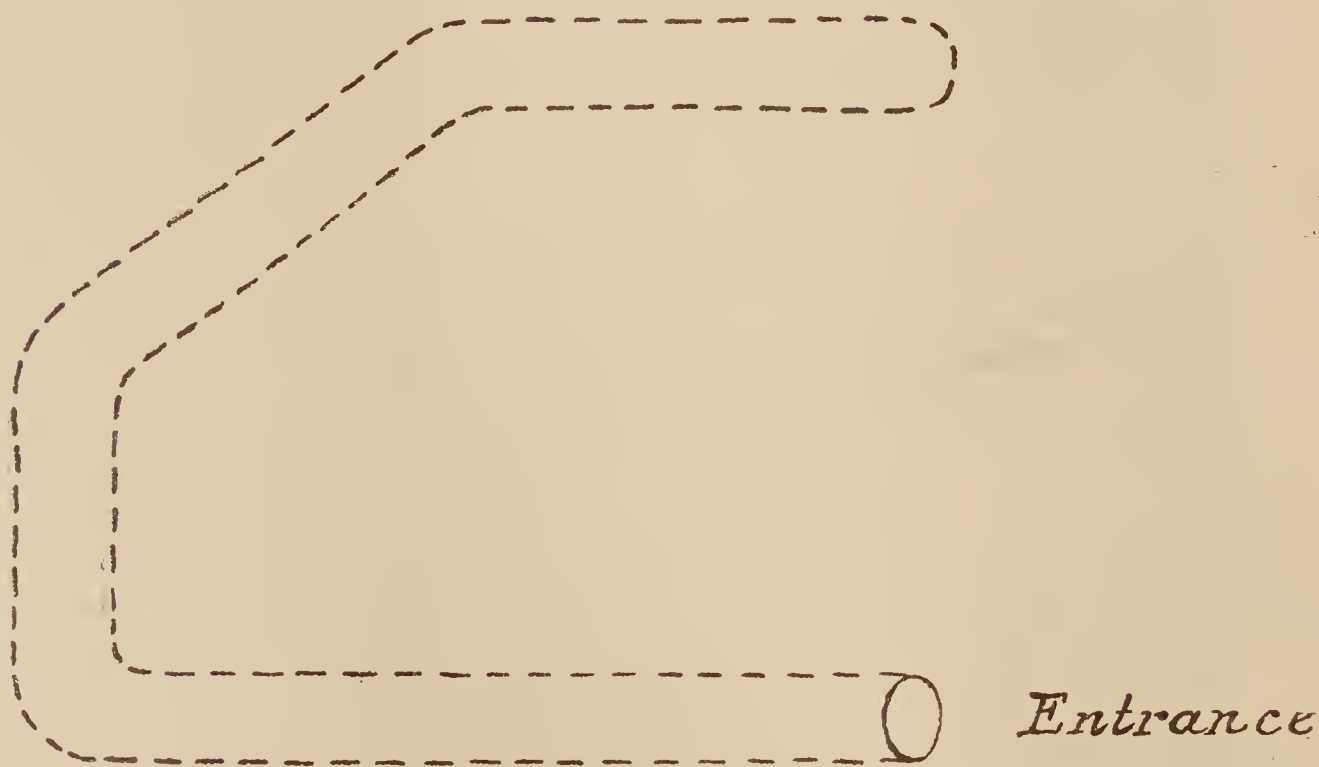
As each Doab of the Punjab rivers is taken up for irrigation and comes under cultivation, this lizard is found to disappear, and the following notes of personal enquiry and observation may be of interest to those who are familiar with this Agamoid.



The Punjab species (*Uromastix hardwickei*, called in Punjabi "Sanah," Hindi "Sanda") is found in the dry and rainless tracts of Baluchistan and Upper India. The rings of the spiny scales on the upper surface of the tail are separated from one another by rows of smaller smooth scales and are not in juxtaposition as found on the tail of the Arabian species. The lateral spines are largest, while those on the upper surface are small. This, as will be seen, is necessary in order that it may defend itself from the attacks of snakes. The small scales on the body are uniform and smooth. The colour appears to conform to the locality in which it is found; in many specimens examined on the Lower Bari Doab Canal, Montgomery District, Punjab, the back was generally covered with a network of black marks on a ground of yellowish coloured skin. Some were light and sandy in colour, others darker and slightly green. But all were marked with a typical spot on the front surface of the thigh. They are generally slow in their movements, but when frightened and making for their holes can get along fairly fast. In size, out of 21 specimens caught within one hour, none were over 15 inches, while the Arabian species grows to 18 inches and over. In the plains of the Punjab these lizards are generally found in slightly elevated spots where they would not be liable to be inundated by rainfall, and large numbers are to be found in certain localities that are suitable to them for food. There are a certain class of low class Indians who eat this lizard and hunt it systematically. These people can distinguish between the male and female by the length, shape and size of the tail, and in no case were they found to err. One specimen said to be a female being opened out was found to contain 15 eggs in it. They appear

to be absolutely harmless and are not known to attack or bite people when captured. They live entirely on vegetable matter, and are supposed not to drink water. During the spring and monsoon seasons, at the time when they are most active, they live on grass, and feast on the flowers and fruits of the Karir tree (*Capparis aphylla*), on the bean of the Jand tree (*Prosopis spicigera*) and the pelu or fruit of the Wan tree (*Salvadora persica*) all indigenous trees of the Punjab.

Just before the winter season sets in, and generally by the end of the monsoon season, they have grown very fat, and acquire two long strips of fat, which are to be found inside, along the whole length of the body on both sides along the back bone. This fat apparently supports them during about four months of extreme winter weather when they hibernate. On their reappearance in the early spring they are very lean, there is little or no fat left, and they are not hunted much till after the laying of eggs they have fattened somewhat. They live in holes singly, which they excavate for themselves. They appear in spring to meet, pair and separate. The females are said to lay white eggs in their burrows, about the size of that of a dove, but perfectly round. Several holes examined had their orifices almost parabolic in shape. The major diameter being about $2\frac{1}{2}$ inches and the minor $1\frac{1}{4}$ inches. One or two of their tunnels when excavated showed that they go down $4\frac{1}{2}$ to 5 feet below the surface and zig zag at right angles and backwards making it difficult for an enemy to attack them. One hole from which a lizard was extracted was as shown below in plan.



The end was $4\frac{1}{2}$ feet below the surface and the length of tunnel was 9 feet and the slope averaged 2 to 1.

The Indians (sweeper caste) who hunt these lizards for food say that the meat is excellent and sweet like chicken, and this must be so as they are purely vegetarians.

Indians either dig it out of its hole, or if water is obtainable they pour it in till the lizard is forced through suffocation to come out. These two methods are troublesome and laborious and the more scientific operations related below are resorted to by these Indians who have observed and hunted the lizard for centuries. Generally after having had his feed, the lizard gets into his hole and lies just inside near the surface. In the forenoon the mouth of the hole is open while he is basking in the sun and in the afternoon and evening he lies near the mouth, covered lightly with earth thrown up with his front feet. The hunter if we may so call him, while approaching does not even allow his shadow to fall on the lizard, but advances stealthily, without shoes, lest the slightest noise should be conveyed through the medium of the earth, which is a good conductor of sound. For if such occurs, the lizard will disappear at once to the bottom of his hole. He holds in both hands the handle of a mallet and when he has reached the correct striking distance suitable to his length of arm and mallet, he strikes so precisely and with such practised and assured aim that he smashes in the tunnel just behind the lizard burying it in pulverized earth.

Having made it impossible for the lizard to turn and retire backwards into its hole, he feels about in the earth and seizing it with his hand draws it forth.

To keep it alive till it is required to be eaten, the spine near the junction of the tail with the body is dislocated. When it is necessary to kill the lizard the method adopted is to place the thumb nail at the junction of the neck and spine bone, and by pressing back the head cause it to snap, which causes instantaneous death.

The mallet, called by the Punjabi Indians "Dharemna," is generally 15 inches long with its upper diameter 5 inches and lower one 3 inches.

The length of the handle has however to be regulated to suit the height of each operator, and this is fixed in each case by making the length, including mallet, from the ground to the waist of the person for whose use it is meant.

Man is not the only enemy of this harmless creature, for snakes are also found to be very fond of attacking it. When a lizard hears the rustle of a snake it turns round and keeps 3 or 4 inches of its tail outside of the mouth of its hole. Stiffening its tail, it shakes it violently in a lateral direction. The snake attacks but is hurt by the side spines of the tail, which are hard and thorny and rip its mouth. After one or two futile attempts the snake, thinking discretion to be the better part of valour, retires defeated from the conflict. If the snake once gets into the hole before the lizard can get his tail outside he can swallow him with ease, because when once seized inside by the head the lizard can do nothing to help himself. The Indians having observed the method of defence adopted by the lizard have turned their knowledge to good account. In the rainy season when snakes are plentiful they take a small broom made of twigs and, coming gently near the hole of the lizard they make a rustling noise on the ground. The lizard mistaking it for that of a snake turns and protrudes his tail, which is at once seized. It can not, however, be pulled out in this way as it holds on with great strength and tenaciousness. A lizard is known to have had its tail pulled off and yet not let go. The Indian, however, does not use force. Having a firm grip of the

tail he introduces a stake sharpened at one end in the form of a crowbar, and levers the lizard out by pressure from beneath.

After killing the lizard as related before, in order that he may clear the internals, the Indian tears open the body on the underside, near one of its armpits, making an opening large enough to allow him to extract the stomach, liver, heart, and entrails, &c. This done, they place them with their backs downward one above the other in a vessel, and pouring in enough water to cover them properly, they boil them well, and then clean the scales and spines off, but do not take off the skin. It is then cut into pieces including the tail, but the four paws and head are rejected. The tail is considered a delicacy. The pieces are then washed and cooked with some clarified butter (ghi) and curry massalas along with any fat that the lizard may have had in it. After this has cooked for sometime, and when nearing completion, some milk made from flour and water is poured in into the vessel and the whole cooked till the grease separates. The wheat flour milk makes a rich gravy in combination with the fat of the lizard.

The fat found in the body of the lizard is also taken out, and boiled down in a vessel over a fire. The liquid obtained thus is of a bright yellow colour, and does not freeze in an Indian winter. It is used medicinally and fetches a high price with Indian Hakeems who use it as a cure for impotence. It is administrated by rubbing on the stomach, spine and thighs or eaten with bread and sugar. It is said to taste nice. On account of its heating properties it is reported to be very effective in Rheumatism, Gout and other similar pains and aches.

As an instance of the antiquity of the practice of lizard eating, it may be noted that Firdousi mentions it in his Shahnama over 900 years ago. He says:—"The Arabs by drinking the milk of she-camel and eating lizards have made such progress that they now aspire to the throne of Persia."

E. HOME PURVES.

MONTGOMERY, 5th December 1914.

[We are indebted to Mr. V. T. Janson for the excellent photograph of this lizard reproduced in the above note. The lizards were sent down alive by Mr. Home Purves and have been living in the Museum for some months. They are extraordinarily tame and placid and permit themselves to be handled without any objection or attempting to bite. If placed on their backs they will lie sometimes for some minutes with their legs in the air without endeavouring to move.—EDS.]

NO. XVII.—NOTES ON SOME SNAKES FROM SIAM.

I have recently sent specimens of the following snakes to the Society's Museum, and the accompanying notes upon them may be interesting.

Trirhinopolis nuchalis.—The only previous record of this snake is, I believe, one specimen in the British Museum, from Toungyi, Southern Shan States. There are also two specimens in the B. N. H. S. Museum from Mansi, U. Burma. They were identified by Lt.-Col. Wall but have not, as far as I know, been recorded.

I have recently procured two more specimens. They were caught in the province of Ratchaburi, some two miles east of the Tenasserim border, in tall evergreen jungle, at an attitude of 770 metres. In lepidosis they agree in every way with Mr. Boulenger's description. (*Cat. of Snakes*, Vol. I. page 419.)

The details of my two are as follows.—No. 1. (sex undetermined, owing to damage). Total length, 458 mm. tail 53. Costals 15 throughout, the median scales faintly keeled on the posterior part of the body. Ventrals 141. Subcaudals 24.

Colour (in spirits). Above light purplish-brown, most of the scales edged with black so arranged across the back as to present a series of fairly well-defined circular or oval rings. Below whitish, freely speckled with black, and with large, black, rectangular spots, placed laterally. A black arrow-headed mark upon the nape, beginning at the frontal shield, and a pale chevron behind it. Most of the head scales edged with black. Chin and throat white.

No. 2. ♂. Total length 458 mm, tail 47. Dorsal keels more strongly marked than in No. 1. Ventrals 132. Subcaudals 24.

Colour. Light pinkish-brown above, the black edging to the scales forming posteriorly fairly welldefined cross-bars. Belly only sparsely sprinkled with black. The rectangular spots become crescentic in shape in the posterior half.

Dendralaphis subocularis.—Previously recorded from Bhamo, in Upper Burma (the types), and from Eastern Siam, one specimen, collected by the Pavie Mission to Indo-China. I have had 4 more specimens from widely separated parts of this country, namely, Den Chai (near Phrae), Sriracha Koh Lam (a small island near), and Bangtaphan. Only the first named locality is of any altitude, the other three places being on the sea.

The total length of my largest was 600 mm. the tail forming 170 mm. Costals 15-15-11 (counted by Lt.-Col. Wall's method). Ventrals 168-158-165-165. Subcaudals 76-95-90-94. Temporals 2+2; supralabials, 8 in two specimens, the 5th entering the eye, 7 in the other two specimens, the 4th entering the eye.

Colour (in life). Above, bronze-brown, becoming greenish-brown upon the tail, the colour ending abruptly $1\frac{1}{2}$ costal scales above the ventrals. Belly pearly-white; beneath the tail, pale metallic citrine. A dark band passes along the outer margin of the belly, occupying the lower half of the last row of costal scales and the adjacent part of the ventrals. It is almost jet black in one specimen, very indistinct in the other three. Another black band passes through the eye on to the neck where it breaks up into short cross-bars and disappears. Lips white. Interstitial skin anteriorly pale blue. In three of the specimens, the vertebral scales upon the neck are yellow.

Dryophis prasinus var. *flavescens*.—Mr Bowden Kloss of the Federated States Museums informs me that he took the first specimen of this colour variety at Trang, in the Siamese portion of the Malay Peninsular. I have recently procured two more from localities near Bangkok.

The first specimen, an adult, was of a bright chrome yellow above (still brighter, I am informed in life) in the anterior two-thirds of its body, turning to a pale fawn posteriorly. Below yellowish-white. No flank line. Chin pure white. The interstitial skin was alternately black and white, as is usual with this species.

The second specimen, a half grown one, which I kept alive for some time, had the yellow colouring faintly tinged with green in the fore part of the body and with brown in the hinder part. Belly pale yellow anteriorly, yellowish brown posteriorly. Tongue and iris yellow. A minute black dot at the margin of each ventral shield in the anterior two-thirds of the body. Interstitial skin, alternately black and yellow, except across the vertebral region, where the yellow became white.

Another specimen of this snake, caught in the same locality as No. 2, was of a dirty cream colour throughout, with tongue and iris to match. The interstitial skin however retained its usual black and white pattern, and this fact, I think, would entitle it to rank as a colour variety, and not as a case of albinism.

I may add that from the localities where the above specimens were caught, both the green and the grey forms of this snake are to be found.

Callophis maculiceps.—A new colour variety. This snake although not common in Siam, appears to be widely distributed about the country. Of the 9 specimens which I have examined two have been so distinct in their markings that they are entitled to rank as a new colour variety, which is as follows:—Above, light yellowish-brown, without the usual series of small dorsal dots, but with a conspicuous black vertebral line running the whole length of the body and tail. The usual tail bands are present. Head and neck black, with a pale yellowish line along each upper lip, interrupted below the eye. Belly coral pink. Tail below, more or less thickly spotted with black.

This variety is similar to the var. *univirgatus* of *Callophis maclellandi*, and the same title would be suitable for it.

Of the remaining seven specimens, six have the usual series of small black dots down the back and do not differ from the recognized description, except that they have in addition a very faint, dark, vertebral line.

The other one is intermediate between the two forms, and has both the dots and the vertebral line well marked.

Mr. Boulenger in the *Catalogue of Snakes in the British Museum* and in the *Fauna of the Malay Peninsula*, gives the number of ventral shields in this species as varying from 205-247. None of my specimens showed so many. They ranged from 173-198.

Lt.-Col. Wall in his supplementary characters of identification (*Poison. Terr. Sn. Brit. Ind.*) says: Anterior sublinguals touch 4 infralabials. This only occurred in one of my specimens and on one side in another. In all the others 5 were in contact.

Hydrophis klossi.—Previously known from a single specimen taken at the mouth of the Selangor River, Federated Malay States. During the last fifteen months, I have received 7 more specimens, six of them from the mouth of the Tacheen River, at the top of the Gulf of Siam, and one from the river Menam, above Bangkok. The latter was found no less than 50 kilometres from the sea, and almost beyond the limit of brackish water. It was caught in the month of May, when the river would be at its lowest level, and the salt water therefore extending furthest inland.

My specimens did not entirely agree with the type description (*Fauna of the Malay Peninsula, Reptilia and Batrachia*, p. 190) and Mr. Boulenger, in reply to those which I sent to the British Museum, wrote "I have compared your *Hydrophis* with the type of *H. klossi*, and although there are differences, I think they must be referred to the same species."

Details of my seven are as follows:—Total length of the longest, a ♂, 1090 mm., tail 115. The greatest thickness of the body is in its third quarter. Rostral shield variable as regards height and breadth, portion visible above equal to $\frac{1}{2}$ to $\frac{2}{3}$ the internasal suture. Frontal as long as broad or longer than broad, never as small as in the type specimen, not as

small as the supraoculars. One præ—and one postocular. A single large anterior temporal. Supralabials 5 (in one a small 6th might be counted by some), 3rd and 4th entering the eye, 2nd largest and in contact with the præfrontal. Sublinguals, posterior pair present in six specimens, absent in one, when present separated by a scale. Marginals present on one side in one specimen, after the 3rd and 4th infralabials. Costals anteriorly 23-27, at the greatest diameter of the body 33-38, imbricate, smooth or keeled anteriorly, with a short or complete keel posteriorly. Ventrals small but distinct, less than half the breadth of two adjacent costals, seldom divided up, 361-395.

Colour (in life). Pale grey above, merging into yellowish below, and with dark grey annuli, as broad above as below in the fore-part of the body, twice as broad above as below in the hinder part.

Two of my specimens caught in December and January respectively contained 2 eggs each, without any trace of embryo.

Enhydris hardwickii.—In the last number of the Journal there is an article upon the Sea-snakes in the Society's Museum. No mention is made of *Enhydris hardwickii*, and I presume, therefore, that the Museum has no specimens. I send four, two ♂ and two ♀.

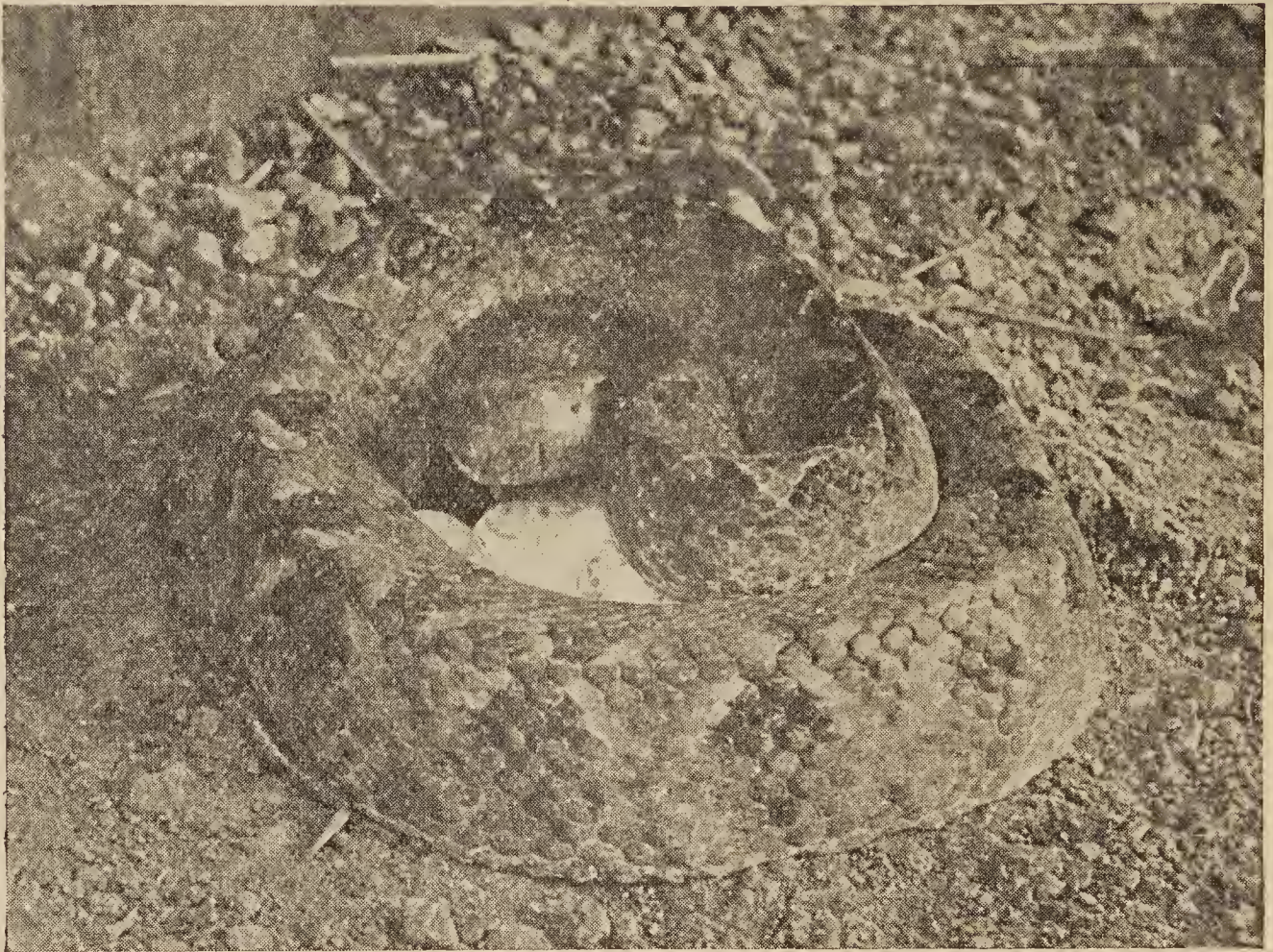
This species is exceedingly common at the head of the Gulf of Siam, infinitely more common than *Enhydrina valakadien*, judging by the number of specimens I receive. They are caught in the nets at the fishing stakes some two miles from the mouth of the Tacheen river, and during the fishing season, which extends from October to March, I can rely upon getting 20 or 30 specimens any day I care to ask for them. They are sent up to me alive and will live for a time in fresh water, but their ceaseless efforts to escape tire them out and in about two weeks they die.

The difference in the sexes in this species is well marked, the males being characterized by the stronger keels upon the scales of the back and sides and by the pronounced tubercles upon the belly. In some old males these latter are very well marked and become veritable spines of considerable length. Another point of difference which so far seems to have escaped observation is the number of scales round the body, which is less in the ♂ than in the ♀. In the former it varies from 23-27 in the anterior part of the body to 26-31 in mid-body, in the latter 29-36 in the anterior part of the body to 33-42 in mid-body. The ventrals are very small and frequently absent altogether so that it is difficult to form a true count. There are, however, less in the ♂ than in the ♀.

Ancistrodon rhodostoma.—This viper has been recently shown to be widely distributed throughout Siam, and in certain places to be fairly common. It has been found as far North as Muang Fang, near the Southern Shan States, and may therefore ultimately be found to enter into the fauna of Burma.

Of the Asian Crotalinae, only one, I believe, namely *Lachesis monticola* is so far known to be oviparous (*vide* Journal of this Society, Vol XV., p. 729). The accompanying photograph, therefore, is interesting, as showing that *Ancistrodon rhodostoma* has also this habit.

The event took place in captivity, but the period of incubation is unknown. The mother had been caught ten months before, and had shared her cage with two others for nine months. It is therefore probable although intercourse was never witnessed that it took place in captivity, although I should state also, that as her two companions are still alive, their sex is not yet definitely known.



The eggs 13 in number, were deposited on the night of September 1st, and the mother was found in the morning to have assumed guard over them in the attitude shown in the photograph, nor did she, as far as I am aware, ever leave them to take anything during the whole period of incubation. I have never seen these snakes drink anything, so that the want of water would be no great privation on her part. In her own sluggish way, she strongly resented any interference with her progeny, and for fear of causing her to desert her eggs, and so bring this interesting occurrence to a premature end, I did not attempt to examine them in detail.

On October 11th, she was dislodged from her post by a falling branch, and did not attempt to regain it, but lay beside her eggs. On the following day she left them entirely to eat a mouse and the same night cast her skin, returning afterwards to her original spot. Whether or no this was in order to continue her guard, I cannot say, as these snakes have the habit of selecting a corner in their cage, to which they usually return time after time, unless disturbed in any way. Six days later, that is 47 days after deposition of the eggs, the first young one appeared and four more followed within 48 hours. Of the remainder, three were shrivelled and dead, and the others did not seem to have sufficient strength to break their envelope. The mother took no notice of them. The young as soon as they emerged were extremely lively, "rattling" their tails with great vigour, and striking out viciously if interfered with. In length they varied from 148-162 mm., and in colouration did not differ in any way from the adults. I could find no trace of a foetal tooth.

The eggs had the usual soft, white, parchment-like covering and were bound very firmly to each other by some glutinous substance. Those I measured were about 22 mm. broad by 30 long.

One other record of the breeding habits of this viper was told me by a European working in a locality where they are fairly common. He killed a

large one in the month of July and about "30 eggs came out when he cut her open." This is no doubt an overestimate of the number, but the head which he sent me in confirmation of his story is considerably larger than the head of my female which laid 13 eggs.*

With regard to the poison of this snake, it is not considered by the country people, in those localities where it is well known, as being fatal to human life, and the observations and experiments which I have been making during the past year with specimens in captivity fully bear out this statement.

MALCOLM SMITH, M.R.C.S., L.R.C.P.

BANGKOK, *January 1st*, 1915.

No. XVIII.—BULL FROG AND RAT-SNAKE.

A large bull-frog (*Rana tigrina*) captured in the act of swallowing a young rat-snake (*Zaocys mucosus*) has recently been presented to the Madras Museum from Kayenkulam in Travancore. The frog has succeeded in swallowing nearly three-quarters of the snake which has a total length of $34\frac{1}{2}$ inches. There appears to be no reason to doubt the statement of the donor who captured the two animals in the exact condition in which they now exist.

B. SUNDARA RAJ,

Zoological Assistant; Madras Museum.

MADRAS, *January* 1915.

No. XIX.—"FISHING WITHOUT A FISH HOOK."

Several of the small mountain torrents and large rivers in Sikkim are full of fish at certain seasons of the year, generally in March, April, May, September and October; and during these months, specially during March, April and May, and late in February, when the water is clear, one often sees the young Paharia and the Lepcha, too, catching fish and getting a fair bag in a very primitive way; no hook is used, only horse hair slip knots or nooses one on either side of the bait which always consists of a couple of grubs tied star wise in the centre. These grubs or worms are got from underneath the bark of the silk cotton tree, the "Simal", and are evidently the young of some borer who is partial to the *Bombax*. These soft grubs have black heads, and yellow and white bodies; and when adroitly tied form a very attractive looking bait ravenously eaten by a certain class of fish, the Snow Carp for instance, also a large fish weighing sometimes up to 8 lbs. called in Paharia "Asla". The Carp is generally got in small mountain torrents, and the "Asla" in bigger rivers, like the Teesta in Sikkim and the Amachu in Bhutan, or Torsa in the Dooars. Last year while camping on the Amachu in Bhutan, in February, I saw two Paharias, fishing with jointed bamboo rods, cotton lines, and horse hair nooses; the rods had three joints, the lines were ordinary sowing cotton four ply neatly twisted and fairly strong. At the end of the line was a foot of horse hair with two circular nooses, the bait being in the centre of the two. Six inches below the bait were several strands of horse hair, all the hair being white, and to one strand was fastened a small smooth pebble picked up in the stream. While casting the line, this pebble often came off as it was not a permanent

* This female has since died. She measured exactly 800 mm. in total length.

fixture, nor intended as such. It was merely a weight to help in casting the line, also to cause the bait to sink to the bottom of the stream, or nearly to the bottom. It was only fastened by one single hair, as the fisherman explained that if it was a permanent fixture it would catch against the rocks and boulders at the bottom of the torrents and streams, which flow very fast indeed, and break his line or else would aid a fish by adding extra unnecessary weight to his frail line. Once a fish is in one of the nooses, and starts struggling and fighting, the pebble breaks or slips away, being only temporarily held by a single hair. It has done its work in sinking the bait and taking it along the bed, it is not required once a fish is firmly held. Even if it sticks between two boulders, when there is no fish caught, a slight jerk soon frees the line and the pebble remains, for the hair fastened to it breaks, as was intended. Experience has therefore taught them that a permanent lead is not required and rightly so. The length of line used was about 50 feet, the one I send you is that length. No reel is used, but the line is wound round a flat 6" \times 3" board having an opening along one side, through which the left hand fingers are passed. The Paharia is very dexterous in his use of this primitive piece of board, it is as you will observe shaped to a cutting edge, so that the line slips off it easily when he is playing a fish. When he wishes to haul in the line he simply pulls it in, in long loops and works it back again on to the flat piece of board very cleverly. In casting he does not cast in the usual sense of the word, but swings his line backwards a bit, by a sidelong pendulum-like movement throws it out, the pebble at the end of the line helping him very considerably, and once the line is out on the swing, he lets out a lot of it, and is able thus to drop his bait at any place he wants to, and a good distance out too. The long rod generally used also helps him to throw well out in a stream if necessary. He always casts in a rapid or fast flowing water not very deep, and not in a pool, or deep fairly still water. I saw several fish caught, and caught some myself but could not play them so well as the Paharia did, not being used to the tackle. He got one over 4 lbs. in weight and it was a little devil, showing great fight. It went down stream as hard as it could go and the Paharia went with it jumping from boulder to boulder with astonishing dexterity; keeping his rod perfectly horizontal for the first few minutes, then he played it very successfully and landed it about 2,000 feet below the place he caught it, as I measured the distance with my tape. The time taken was about 20 minutes, for, as he explained, he had to tire out the fish properly, as he could not take any liberty with his frail line. This 4 lbs. fish was held just below the gills by the noose on the right hand side; the noose on the left was not out of shape at all, being perfectly circular and complete. Fish are held in various ways, some round the neck, some by the tail, some by the snout, and some even by one fin only. I have seen them held by all these parts. One Paharia assured me he had got two fish at the same time once, Snow Carp, and I can imagine this quite possible for in one or two streams you cannot pull them out quick enough with an ordinary fish hook, using "atta," or worm bait, they are so ravenously hungry and numerous. The bait once put on properly in the centre of the nooses is used over and over again, in fact for a whole day's fishing, as no fish can ever swallow or eat it up, it is so well fixed and they never get properly at it. Many fish slip away from the nooses even after they have been played for some time and this is but natural, as they are so slippery and wriggle themselves free; but not many escape that are held round the neck; on an average about one in three get away and slip through. This you can always tell as the size of the noose that held it comes out of the water much smaller than the others. The

marvellous thing about these nooses is that even in a roaring torrent they never lose their circular shape, or become ineffective through the action of water on them while immersed; one seldom has to readjust them.

The recurring trouble or bother is in replacing the small round smooth pebble which so often gets detached, and lost, sometimes in the water and sometimes while casting. The rod and tackle I brought in from Bhutan were shown by me to a Captain and Mrs. York, of Hutton Hall, Marston, at the Woodlands Hotel, Darjeeling. He was travelling sight-seeing in India and was a great fisherman and his evident keen interest in the primitive equipment for fishing without a hook was so great, that I made a present to him of the tackle, but the rod is with me.

C. H. DRACOTT, C. E.,

State Engineer, Sikkim.

GANGTOK, 6th March 1915.

No. XX.—THE BUTTERFLY *ARGYNNIS CASTETSI* IN TRAVANCORE.

With reference to note No. XXI on page 587 of Volume XXIII, No. 3 on *Argynnis castetsi*, it is a mistake to restrict the occurrence of this butterfly to the Palni Hills in S. India as it is just as common on the Kannan Devan Hills, commonly known as the High Range of Travancore.

The Palnis run East to West from near Dindigal to the Travancore frontier at Pambardi Shola. They are divided by the Neutral Saddle into the Lower and Upper Palnis. The Lower Palnis are East and the Upper Palnis, West of the Saddle. *A. castetsi* has been reported from the Upper Palnis, but it would be interesting to learn the dividing line on the East, where it ceases to occur. There is no reason why it should not be found on Perumal Mallay which is on the Lower Palni side of the Neutral Saddle. The Western Ghauts run from near Cape Comorin in the south without a break to the Palghaut gap on the North. At the Pambardi Shola frontier of Travancore the Palnis join the Western Ghauts at that part of the latter called the High Range. On the Palnis the rainfall is less and the plateau country less rugged than on the High Range of Travancore, and the change is quite definite and apparent at Pambardi Shola. The Travancore valleys are deeper and the summits of hills and the elevated plateaus higher than on the Palnis and there is more forest.

The rainfall increases the further west one goes from the Palnis. The heaviest rainfall on the latter occurs in the N.-E. Monsoon during the months of October, November and December, while on the High Range the period of heaviest rainfall is in the S.-W. Monsoon in June, July and August.

I have taken *Argynnis castetsi* on the Kannan Devan Hills at 4,500 feet, where the rainfall is about 300 inches per annum, and frequently exceeds that amount in certain years. I have seen it also on Aneimudi mountain 8,837 feet altitude. In this vicinity the hills become the British Annamallays and there is no reason why this butterfly should not extend over them as the character of the country remains the same for some miles. It alters further west in Coimbatore District into practically unbroken forests of very large timber. That country is being opened up into Coffee, Tea and Rubber Estates, which will probably mean the introduction of the food plant of the caterpillar from the surrounding hills, and with this the butterfly is likely to follow. The Palghaut gap between the Annamallays and the

Nilgiris is not so wide as to make it impossible for the winged insect to cross, so that it is curious if it does not occur on the Nilgiris, the climate of which approximates to that of the Palnis.

If the butterfly is not found on the Annamallays, it would be another interesting point to ascertain the exact point where it ceases to exist in that region, and the cause, which is not apparent to one who like myself knows the country well, though I have not had the opportunity of chasing butterflies further than the Kannan Devan Hills.

I see Bingham (*Fauna of British India* Series) mentions a Nilgiri form, and "♀ Typical as described from Trichinopoly," this cannot mean that the insect occurs at Trichinopoly, which is the headquarters of Father Castets, S. J., (after whom the butterfly was named), who works in St. Joseph's College in that town.

AYLMER Ff. MARTIN.

BANGALORE, March 1915.

NO. XXI.—THE "MOON-MOTH" AS A PEST.

This beautiful wild silk moth—" *Actias selene*, Hub." popularly known as the moon-moth—is one of those insects not commonly met with in numbers. It might, therefore, be interesting to note that recently at the Agricultural College, Coimbatore, this insect has been so numerous as to become a pest. A number of trees, *Odina wodiaria*, four to five years old, growing in front of the College were literally denuded of almost every leaf by *Actias* larvæ. Photographs show one tree completely defoliated with a few cocoons attached to the bare branches and another partially damaged. A few of these stout and gaudily coloured caterpillars first appeared on some of these trees in October last and I did not then suspect that this rare insect would again appear in such numbers as it did later. The second brood of caterpillars was observed on these trees in December and very recently by about the middle of February the third set of caterpillars appeared. This last brood of worms was sufficiently numerous to do a considerable amount of damage to the young *Odina* trees. Many of these are bare and completely leafless while a few others have been almost skeletonised. On the soil around some of the badly attacked trees was seen a thick layer of excrement pellets almost resembling sheep's dung. The large flimsy and dirty yellow silken cocoons are found attached in numbers to the lower portions of the stems of the trees close to the soil though a few are found attached to branches and enclosed by a few leaves. A detailed account of the life history of this insect as studied at Mussoorie is given by Hutton (see—Cotes' account of the Wild Silk Moths of India—Indian Museum Notes, Vol. II, No. 2-1891); but it may be noted here that the time occupied by each stage in the life history of the creature differs in this locality as compared with that at Mussoorie. This is naturally due to the climatic variations between a place along the Himalayas like Mussoorie and one in the plains of South India. This insect has been noted to feed on various plants such as *Xanthoxylum acanthopodium*, *Cedrela paniculata*, *Corearea nepalensis*, etc., etc. I have found it once or twice before on the Moringa tree (*Moringa pterygosperma*) in Saidapet, Madras, but only one or two caterpillars at a time and these moths were till now preserved as rare specimens for the collection. Thwaites has noted it feeding on *Odina wodiaria* (see Moore's Lepidoptera of Ceylon). It will be interesting to learn if any of the readers of this Journal have noted this insect on any of these plants in such numbers at any time.

This is evidently one of those insects which occasionally depart from their normal course of life and assume the more important role of pests when the circumstances happen to be favourable. What the circumstances were in this case it is not possible to assert with any accuracy. *Odina wodier* is, of course, not a plant of any great economic importance but we would certainly be surprised if one day the insect appears in numbers on an useful plant like 'Moringa' which happens to be one of the insect's alternative food plants. In conclusion, it need hardly be stated that examples like this often give us warnings of what possibilities there are among insects and make us keep an eye also on all general insects instead of confining our attentions solely to the known depredators of the insect world.

T. V. RAMAKRISHNA AIYAR, B.A., F.E.S., F.Z.S.,
First Assistant to the Govt. Entomologist, Madras.

THE AGRICULTURAL COLLEGE,
COIMBATORE, 9th March 1915.

[We have been unable to publish the photographs.—EDS.]

No. XXII.—THE SWEET ARECA NUT, *ARECA CATECHU*
VAR *DELICIOSA*.

PRELIMINARY NOTE.

The authors in describing the species *Areca catechu* L. in the *Flora of British India*, Vol. V, page 406, do not mention the astringent taste of the seed. The ordinary betel nut has a very astringent taste when tasted raw (before boiling), the amount of tannin and glucosides being over 14 per cent. (Lewin. über *Areca catechu*, &c.). The present variety is fairly sweet to eat and is further distinguished by the fact that the endosperm is much lighter in colour and softer. On account of the latter character, it becomes pulpy and does not lend itself to the treatment which the areca-nut undergoes before being sent to the market. The cultivators find it a loss to propagate these plants and it only grows occasionally in the areca gardens. The plant bears the same type of fruit year after year and has to be ranked as a distinct variety. I propose the name var. *deliciosa* on account of its pleasant taste.

Areca catechu L. var *deliciosa* : Tree 40 to 80 feet high with leaves and flowers similar to those of *Areca catechu*, fruit slightly smaller about 1 inch in diameter, remaining green even when nearly ripe, endosperm pale white in colour, soft when ripe, percentage of tannin much less.

Distribution :—Occasionally met with in the areca gardens in the Western Ghats of Mysore.

M. K. VENKATA RAU,
Sr. Asst. Mycologist.

BANGALORE, 8th March 1915.

No. XXIII.—NOTES ON CUTCH AMMONITES.

VI.—*The Habye Hills.*

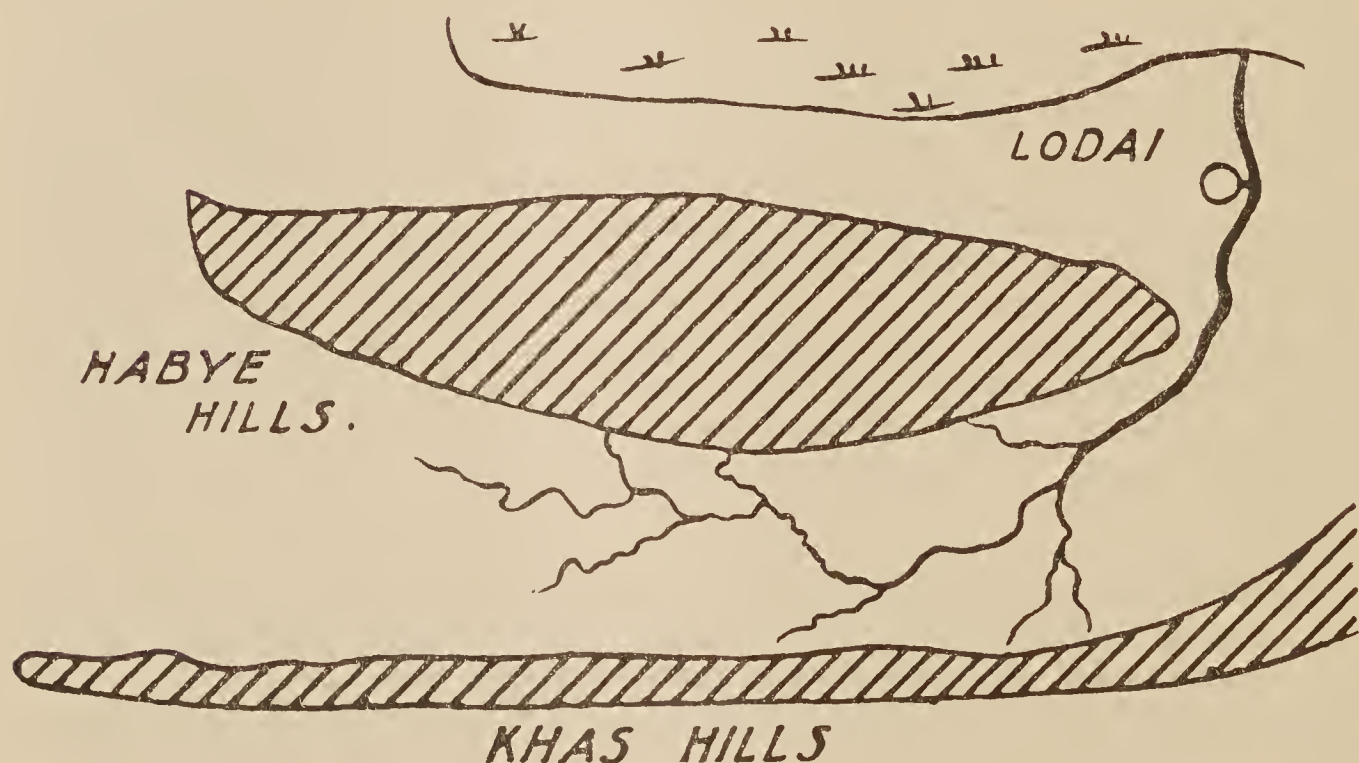
In previous notes I have shown how the rocks which compose Cutch have roughly speaking been crinkled into three folds, with axes running East and West, in parallel lines. The first line (from the South) occurs 30 miles North of the Gulf of Cutch; the second line, 16 miles North of the first; the third

line 30 miles North of the second, forming the "islands" of Putchum, Kareer, &c., in the Runn. The first line I have sketched as it occurs at Ler, Fakirwadi, Bharasar and Sumatra. The second line has been illustrated by its exposure at Keera Hill, to which I now add the exposure in the Habye Hills. The third line must wait a bit.

SEQUENCE OF CUTCH AMMONITE BEDS.

The inset table shows the sequence of the Ammonite beds in Cutch. The "Sub-Anceps beds" are an addition of my own to the usually recognized list; for there seems to me to be a distinct type of rock coming up from below the Anceps in which I have found no Anceps fossils: yet it lies much above the *Macrocephalus* beds. A fossil much like Waagen's *Perisph*, *Perdagatus* seems its characteristic.

Oomia beds (NEOCOMIAN).
Ketrol beds (KIMERIDGE).
Dhosa Oolite (OXFORDIAN).
Athleta beds (CALLOVIAN).
Anceps beds (CALLOVIAN).
Sub-Anceps (CALLOVIAN).
Macrocephalus beds (CALLOVIAN).
Putchum beds (BATH).



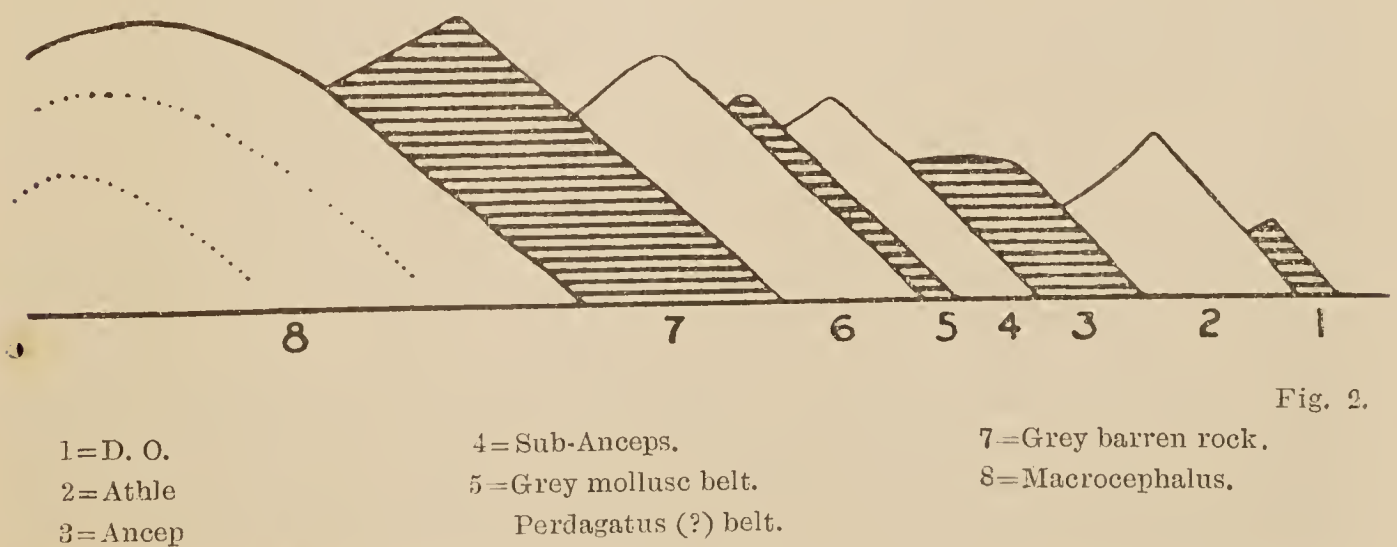
North-East of Bhuj, some 12 to 15 miles away, rise the Habye Hills, a chain 9 miles long and two miles wide, tapering somewhat suddenly at both ends before diving down again below the level of the plain. Their highest points are about 800 feet high. To explore them the village of Habye, once the site of Cutch's capital, makes a good head-quarters. It lies on the south side of the hills, $2\frac{1}{2}$ miles from their east end. As you approach the hills from Bhuj, you cross the ridge of the Khas hills, which consist of cold yellow and brown sandstone slabs, guiltless of Ammonites. They dip south and are scarped on the north front; probably at one time they extended further north and formed a sheet covering the whole of the Habye Hills. Climbing down the scarp, you find yourself in a flat valley some two miles wide stretching up to the base of the Habye

Hills. These latter come up in sheets of rock sloping up to the north-folding over at about $1\frac{1}{4}$ mile from the base, and slanting down at a steeper angle to the fields which fringe the Runn. The valley is drained by a largish stream with many tributaries from the hills on either side—which runs east and curves round the eastern end of the Habye Hills, proceeds N. to the village of Lodai and loses itself in the Runn. It is however only a monsoon river: by February only a few tricklets are moving.

Nature has been hard at work on the hills with her chisels of rain, wind, cold, &c. The whole mass is seamed and scarred with very deep nullahs which almost from their commencement on the summit have cut deep down into the surrounding beds of rocks, leaving ravines with the strata exposed in cliffs. The topmost ridge consisting of the earliest strata is scored and bent by these agents, it runs for a hundred yards or so and falls into a ravine to rise again further on.

The first thing to do is to decide your geological footing. This is not difficult. Riding along the cart-road along the south edge of the hills, you will probably notice an Ammonite fragment here and there lying among the yellow slabs. 'Hullo' you say: 'that's the duplicate of a Samatra *Athleta*.' Sure enough it is. It differs somewhat from Waagen's illustration, but it is more akin to that than to any other Peltoceras which he gives, and it is on the same level, for further search reveals other *Athleta*-bed species. *Harpoceras dynastes* is here: also the big flat plate-like fellow which is remarkably like Waagen's illustrations of *Aberrans* and of *Congener*. This species is a marked feature of the *Athleta* beds along Fakirwadi Ridge. A stroll along this same slope of rock later revealed two *Aspidoceras ponderosum* and also a new *Lytoceras*—of which more later.

Now along the Fakirwadi Ridge, at Ler, at Samatra, the *Athleta* beds are all soft—hollowed away by rains. Here the ridge is of hardstuff—tough yellow slabs with some layers of rounded stones like huge artichoke roots. Still it is all *Athleta*: on the tops of the ridge was a *Harp. dynastes* embedded in a slab. And the scarp on the other side of the ridge shows the thickness of the *Athleta* beds to be here about 70 feet. As you pass eastwards along the cartroad you will see a darker rock protruding in places on your right. Examine this: you will find it to be Dhosa Oolite with great round *Stephanoceras* (*transiens* and *polyphemus*, as far as I can judge) embedded. And further east still where the curve of the strata round to the N. begins, the slab rocks which here form the base of the hills are of D. O., studded with the water worn discs of *Asp. perarmatum*, *Steph. transiens*, *Nautilus*, &c., all old D. O. friends. An excellent specimen of *Per. rota* was also found. In a nalla a short way within D.O. rocks there lay a large flat pancake-like *Phylloceras* with apparently no furrows, but this may have come down from inner beds.



Having established the D. O. and the Athleta beds, one not unnaturally looks to see if the Katrol beds are at all in evidence. The place they should occupy is just outside the D. O. beds—but here it is all the wide sandy nulla, which would seem to have eroded all the outcrop of the katrol layers. Considering how tough and hard the katrol beds along Fakirwadi exhibit themselves, one would have thought the nulla would have left several ridges outstanding: but from Habye for some distance east and west there are no signs of katrol strata. However from near the village of Jihadi—two miles west—a man brought me several Ammonites of distinct katrol era: and I found katrol beds on the north east side of the hills near Lodai tank. Looking towards the range from this latter tank, you see a cluster of low flatly rounded knolls, coming down close to the tank. Examine their broken debris—and you will find katrol fossils. One is just like the common *Bathyplocus* in its earlier stages: and one is an *Oppelia* (?) with faint spiral furrow along the middle of the whorls—just such a one as I found in sandy nodules at Yala Khawas in the Fakirwadi katrols. Other fragments bear out the identity of the beds. One might guess that when the Habye hills were squeezed up into their anticline, these knolls were squeezed up as well. I had no time to examine the mass of them—but their facies seemed much the same all over. So we may now consider it proved that we have got exposed here the usual sequence—so far: viz., Katrol, D. O., and Athletas.

To give a logbook of expeditions would be of little interest. I will confine myself chiefly to the easiest ascent which I struck. Ride along the cart road from camp eastwards till the road dips down into the big nulla of the Khaswali River—just where the melon patches are being cultivated. Here on your left there emerges, through a cutting in the D. O. and Athleta ridges, a small stream. Looking up through the gap, you see the ground rising in easy slopes up to the crest of the main central ridge about a mile away. Follow the nulla upwards.

Your first ridge is D. O.: the second, Athleta: the third is a long gradual slope of 300 yards. It is Anceps. Ammonites are rare—but the nulla shows great quantities of marbled crimson slabs—marbled with the white of shells. (There are too a great many slabs of a tough bluish-white stone crammed with molluscs but these come from a bed someway higher up.) One Ammonite fragment looks like *Per. gudjinsirensis* which 'grows' in Fakirwadi Anceps: there are plenty of belemnites, pectens and other molluscs. The dip of all these strata is, I should guess, about 15° . The "false conglomerate" which occurs under Anceps beds in the Ler Hamundra section also occurs here, coming up just where in my opinion the line between Anceps and Sub Anceps beds may be drawn. Then come hard dark-brown slabs of rock—full of mollusc life—rhyconella, pectens, etc., also an Ammonite of the *Perdagatus* type, found in the same beds in the Ler Hamundra Ellipse. Also a hollow-backed Nautilus—possibly *kumagunensis*. (I might here add that hollow-backed Nautili occurs also in Athleta beds and in D. O. Waagen's hollow-backed one was only from Macrocephalus strata.) Descend the Falus of the Sub Anceps scarp, and you will find the light bluish white slabs—of which many fragments have been carried down the nulla—lying in situ. They form a great sheet, coating the succeeding hill: I found only one Ammonite here—one of the *Perdagatus* type and from its beautiful preservation and clearness I longed to find more—but time forbade. Towards the summit of this knoll—whose lower part these slabs cover—the grey fades away into yellow brown rocks which rise into a ridge. Sitting down for a rest on its summit, one noted the protruding edge of an Ammonite—which when duly hammered out of its environment showed some affinity with the Ancep's family. The inner whorls had the large spine like

that of *Per. rehmanni* at the furcating of the ribs: but the outer whorl had lost all spines. Unfortunately the specimen was only partial, and much corroded. Some slabs on the top of the ridge were coated thickly with clusters of a diminutive blue white shell, straight, tubular, tapering. I found the same on the summit of a knoll in the Ler Hamundra Ellipse. I cannot find any sign of this species in Zittel's Palaeontology Text Book.

The sides of this knoll, which is the limit of the Sub Anceps beds, slope down to nullahs: and from underneath the knoll beds, there sweeps up the great grey mass of rock which proved so damping in the Ler Hamundra Ellipse. At this point the strata of these barren grey rocks does not seem to be so thick as they are three miles west. There they are of perhaps 200 feet thickness: here perhaps only 50 feet. The ever-handy nullah shows them in profile. They run sloping up at the same angle as the outlying strata, but as they come more east, they dip round in an easy curve so that they shut in the whole central core of the hills. This central core runs in a light yellow ridge, over topping the fallen-away husks of the barren grey sandstone. It is yellow with dried grass: its matter is dark crimson of which patches appear here and there.

Now this core is the exciting part of the whole thing: the main hope with which I started for these hills was that of finding golden oolite here. The books make no mention of the golden oolite of Keera existing here: but by the usual sequence of rocks, it should be here. The specimens described by Waagen as coming from this neighbourhood were only ten in number, 8 of which were from the D. O. The existence of a *Nautilus kumagunensis* seems to have puzzled him: and the finding of a *Steph. dimerum* (a *Macrocephalus* species) is located as "N. W. of Lodai"—which would be out in the Runn. If the previous explorers had negotiated the central core of those hills, the solution would have been found. The central ridge is of the *Macrocephalus* age. After much prowling over the small broken crimson cubes of the summit, an Ammonite—much like *Steph. diadematum* was discovered. Other specimens gradually followed—one and all repeating the form and features of the *Stephanoceras* of Keera Hill. To say that this or that specimen is a *Dimerum* or *Grantanum* is not allowed until one has more of the types available for comparison, but I have no hesitation in believing that these crimson beds were being deposited in the seabed at the same time that the golden oolite and shales of Keera were being laid down. The *Stephanoceras* which I have found resemble the following of Waagen's list:—*Diadematum*, *Chariense*, *Macrocephalum*, *Subtrapezium*, *Dimerum*, *Grantanum*, and also *Arenosum* (which latter Waagen places in D. O. beds).

Now I had no time to explore the north side of the ridge. From the summit, by the Jhakle temple, one could see a very deep nulla side running north, cutting deep down into the strata of the beds a very short distance north of the summit of the anticline. Such a nullah should (if the ground is not faulted) reveal the section of the beds to a good depth below this crimson *Macrocephalus* stratum. There are said to be deposits of black marble just about there: none of these beds so far examined on the south side of the anticline show any traces of marble. Nor have I explored the west end of the hills—beyond discovering once the rise of Katrol beds (dipping W) some way from the west end of the main mass of the hills. From a distance one can see that the main yellow ridge (yellow with grass) runs persistently to well nigh the west end of the mass. Hence these notes do not profess to give anything like a complete account of the hills. Yet as they may be of use to a scientist who may desire to thoroughly exploit the Cutch Ammonites, I send them as they stand.

The *Lytoceras* of the Athleta beds referred to above is only the fragment

of a large whorl with sutures to the end. There are no traces of cremulations. The striae-like ribs are numerous and close, rather more pronounced on the periphery and on the inner curve than on the sides. The Athleta beds also produced two *Echinolampas* fragments and several large bits of coral. The corals were in nullahs and may have been washed down from beds higher up the hills and therefore of earlier deposit.

J. H. SMITH.

BHUV, Feb. 25th, 1915.

PROCEEDINGS

OF THE MEETING HELD ON 4TH MARCH 1915.

An 'At Home' and Meeting of members and their friends of the Bombay Natural History Society took place in the Society's Rooms on the 4th March 1915.

The election of the following 39 new members since the last Meeting was announced:—Mr. Bernard Triggs, Rutlam; Mr. W. T. Saxton, Ahmedabad; Mr. H. M. Drummond-Hay, Ceylon; Lt. C. M. Ingoldby, R.A.M.C., Jullunder; Mr. G. E. Shaw, Mungpoo; Mr. C. D. McIver, Satara; Mr. S. C. Mustafi, Cooch Behar; Mr. E. A. Sitzler, Shwegyin; Mr. B. Breslauer Bombay; Mess Secretary, 2nd Q.V.O. Sappers and Miners, Bangalore; Mr. L. F. Hirst, Colombo; Mr. F. C. Lewis, Myitkyina; Mr. F. Goodyear, Bombay; Revd. A. G. Rondano, S.J., Mangalore; The Honorary Secretary, Frere Hall (Municipal) Library, Karachi; Mr. T. Gilbert, Dharwar; Mr. J. Makeig-Jones, Champaran; Mr. H. Unge-Froren, Lohardaga; Mr. H. Montgomery, I.C.S., Shikarpur; Mr. Chas. R. Major, Kawkareik; Mr. H. T. Mayo, B.A., Karachi; Mr. C. A. Phillip, Calcutta; Lt. E. A. Glennie, R.E., Manora, Karachi; Mr. Alfred Hay, Bangalore; Mr. R. Marrs, Bombay; Mr. Nand Kumar Tewari, B.Sc., Lucknow; Mr. P. J. H. Stent, I.C.S., Saugor, C.P.; Mr. M. H. F. Swete, Papun, Burma; Mr. Norman Wilks, Bombay; Mr. R. V. Argyle, Dharwar; The Mess President, 46th Punjabis, Nowshera; Mr. R. R. O'Hara, Henzada; Mr. M. W. Clifford, I.F.S., Dehra Dun; Mr. M. Mahommed Abubakr Khan, Dadon, Aligarh; Mr. G. C. Gooding, Calcutta; Mr. G. C. Shannon, I.C.S., Bijapur; the District Medical Officer, Burma Railway, Insein, Burma; Mr. J. Hezlett, I.C.S.; Mr. K. R. Alling, Bombay.

ELECTION OF THE COMMITTEE.

The following gentlemen were elected as office bearers for the present year:—President, H. E. The Right Hon'ble Lord Willingdon, G.C.I.E.; Vice Presidents—Mr. J. D. Inverarity, B.A., LL. B.; Revd. F. Dreckmann, S.J.; and the Hon'ble Mr. Justice N. C. Macleod; Managing Committee:—Revd. J. Assmuth, S.J.; Mr. T. Bainbrigge Fletcher, F.E.S.; Mr. T. R. Bell, I.F.S.; Mr. C. L. Burns; Mr. E. Comber, F.Z.S.; Lt.-Col. G. H. Evans, C.I.E., F.L.S.; Major W. H. Evans, R.E.; Prof. G. A. Gammie; Mr. F. Hannyngton, I.C.S.; Mr. G. S. Hardy, I.C.S.; Mr. N. B. Kinnear; Lt.-Col. K. R. Kirtikar, I.M.S. (Retd.); Major W. G. Liston, C.I.E., I.M.S.; Mr. F. M. Macwood; Mr. J. McNeill, I.C.S.; Dr. A. Powell; Mr. E. L. Sale, I.C.S.; Mr. R. A. Spence; Lt.-Col. F. Wall, I.M.S., C.M.Z.S.; Mr. John Wallace, C.E.

Honorary Secretary:—Mr. W. S. Millard; Honorary Treasurer:—Mr. L. H. Savile.

The Honorary Secretary acknowledged the following contributions to the Museum since the last meeting:—

Contribution.	Locality.	Donor.
South Indian Marten (<i>Martes gwatkinsi</i>).	Coorg	Mr. F. Hannyngton, I. C. S.
Head of Muntjac (<i>Muntiacus vaginalis</i>).	Near Karjat ..	Mr. Nash.

Contribution.	Locality.	Donor.
Stump tailed Macque (<i>Pithe-</i> <i>cus arctoides</i>).		
Chinese Tufted Deer ..	N. of Bhamo ..	Mr. F. C. Lowis.
Takin Skins (<i>Budorcas</i>) ..		
Golden Cat (<i>Felis temmincki</i>)..		
David's Weasel (<i>Putorius</i>) ..		
Striped Weasel (<i>Putorius strigidor-</i> <i>sus</i>)	Paletwa, Burma..	Mr. W. S. Thom.
1 Nilgai	Ferrozepore ..	Capt. Lamott.
2 Blackbuck		
1 Chink head (all mounted) ..		
Also horns and skulls of 6		
Blackbuck and 7 Chink and		
2 young Gavials (mounted.)		
Desert Cat (<i>Felis ornata</i>) ..	Karachi	Mr. J. M. S. Culbertson.
Small Indian Civet (<i>Viverricula</i> <i>malaccensis</i>).	Malabar Hill ..	Mrs. Sanders Slater.
Trade skins of Shaw's Cat (<i>Felis</i> <i>shawiana</i>).	Borders of Ladak and E. Turkis- tan.	Mr. A. Canning.
Musk Deer (<i>Moschus moschiferus</i>)..	Tibet	Mr. C. H. Dracott.
1 Desert Fox (<i>Vulpes leucopus</i>)..	Sirsa	Mr. H. Whistler.
1 Jungle Cat (<i>Felis affinis</i>) ..		
2 Imperial Sandgrouse (<i>Ptero-</i> <i>cles arenarius</i>).		
3 Young Wild Dogs (<i>Cuon dukhu-</i> <i>nensis</i>) (presented to Victoria Gardens).	Banda, U. P. ..	Mr. G. B. F. Muir, I. C. S.
Large Pig Skull (<i>Sus cristatus</i>) and 1 Bat.	Garhwal	Mr. A. E. Osmaston.
4 Sloth Bear Skulls (<i>Melursus ursi-</i> <i>nus</i>) some Butterflies, Moths, Beetles, Snakes, Bats and Birds' Eggs and Nests.	Various	Mr. C. R. S. Pitman.
Golden Cat (<i>Felis temmincki</i>) ..	.....	Mr. M. R. Leonard.
1 Turnstone (<i>Arenaria interpres</i>)..	Manipur	Mr. J. C. Higgins, I. C. S.
1 Young Comb Duck (<i>Sarcidiornis</i> <i>melanonotus</i> .)	Dhar, C. I. ..	H. H. The Maharaja.
2 Avocets (<i>Recurvirostra avocetta</i>)..	Uran	Mr. A. H. A. Simcox, I. C. S.
Young falcated Teal (<i>Eunetta</i> <i>falcata</i>).	Roorkee	Major A. H. Cun- ningham.
4 Birds	Katha District ..	Mr. C. E. Milner.
3 Tragopans (<i>Tragopan satyra</i>)	Sikkim	Mr. C. H. Dracott.
1 Pigeon		
4 Moth Cocoons, sp ? ..		
1 Water Rail (<i>Rallus aquaticus</i>) and a number of Butterflies.	Chakrata ..	Major R. W. Burton.

Contribution.	Locality.	Donor.
Raven (<i>Corvus corax</i>) and Buzzard (<i>Buteo ferox</i>).	Punjab	Mr. A. E. Jones.
Nutcracker skin (<i>Nucifraga multi-punctata</i>).	Chitral	Capt. R. D. O. Hill.
Wood Owl (<i>Syrnium indrani</i>) ..	Ahmednagar ..	Mr. E. A. Doran, C. I. E.
2 Snakes	Ootacamund ..	Mr. A. Descubes.
Cobra swallowing a wolf snake (<i>Lycodon aulicus</i>).	Coorg	Mr. F. S. Sprott.
8 Snakes	Castlerock ..	Mr. R. L. Sinclair.
4 Centipedes		
1 Leech		
3 Bats		
6 Frogs	Madras	Dr. J. Henderson.
10 Cockroaches		
4 Spiny tailed lizards (<i>Uromastix hardwickii</i>) (alive).	Montgomery ..	Mr. E. Holme Purves

MINOR CONTRIBUTIONS.

Messrs. E. Comber, Counsell, N. A. Masani, Carl Meyer, R. J. Boyd, W. S. Millard, H. R. Hume, Dr. Suter, Mr. Cope, Assistant Surgeon Mewand, Mr. A. E. Currie, Mr. N. B. Kinnear, Capt. R. D. O. Hill, Messrs. C. H. Dracott and D. Dewar.

SPECIMENS SENT IN FOR THE MAMMAL SURVEY.

Contribution.	Locality.	Donor.
The Upland Hare (<i>Lepus hypsidus</i>), Crab eating Mongoose (<i>Mungos urva</i>), Pallas's Cat (<i>Felis manul</i>), Golden Cat (<i>Felis temmincki</i>), Panda (<i>Ælurus fulgens</i>).	Tibet & Sikkim ..	Mr. C. H. Dracott.
2 Jackals (<i>Canis indicus</i>) ..	Multan	Major Lindsay Smith.
1 Jackal („ „) ..	Rawalpindi ..	Mr. F. Tod.
1 Hare (<i>Lepus peguensis</i>) ..	Taungdwingji ..	Mr. F. C. Purkis.
1 Hare (<i>Lepus ruficaudatus</i>) ..	Midnapur Dist. ..	Mr. A. Burrugh.
1 Albino Blackbuck (<i>Antilope cervicapra</i>).	Ahmedabad ..	Mr. R. H. Heath.

THE ACCOUNTS FOR 1914.

Mr. L. H. Savile, the Honorary Treasurer, in presenting the accounts for the year ending 31st December 1914, said :—
The opening balance at the beginning of the year was Rs. 2,198-3-10 and the closing balance Rs. 2,394-6-3 shows a profit of Rs. 196-2-5 on the year's working.

The expenditure during the year amounted to Rs. 45,172, which is Rs. 9,488 more than last year, the receipts however are Rs. 45,368, an increase of Rs. 9,605 over 1913. This large increase in the expenditure and receipts is principally due to money paid out on "Snake Books", "Pigeon Books" and "Wood-destroying White Ant pamphlets," the expenditure on which amounted to Rs. 6,752 and the receipts Rs. 9,530 which accounts for a large portion of the increases referred to.

The total amount received in subscriptions including arrears and those paid in advance for 1915-16 and for Life-Membership amounted to Rs. 22,403 which is considerably less than the 1913 subscriptions which amounted to Rs. 24,142.

The amount received by entrance fees was Rs. 1,480 which represents 148 new members as against 72 resigned—a nett increase of 76 members.

The amount paid this year on the Journal account was Rs. 20,362. This includes a large number of extra plates which had to be paid for at an enhanced price but which were found to be necessary on account of the demands for extra journals on account of the continually increasing number of members. The value of new plates paid for 1914 but not as yet utilized amounts to Rs. 2,603.

The accounts as above stated show that the Society is in a sound financial position but in order to maintain the valuable work now being carried on it is necessary that the number of members should continue to increase.

MAMMAL SURVEY FUND.

The opening balance of this fund was Rs. 14,848 and the closing balance Rs. 14,860 so that the expenditure and receipts during the year very nearly balanced. During the year Rs. 25,332 was received in donations to which adding interest on investments made the total receipts for the year as Rs. 25,949. The expenditure during the year was Rs. 25,937 or slightly less than last year which is due to three out of our four collectors having temporarily relinquished their posts towards the end of the year in order to go on active service.

On account of the temporary absence of three collectors the work of the Survey will be to a large extent in abeyance but the money collected is all invested and with the interest received will be available to continue the Survey as soon as the war is over.

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